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REPORT

OF THE

Royal Commission

ON

Tuberculosis

PROVINCE OF QUEBEC

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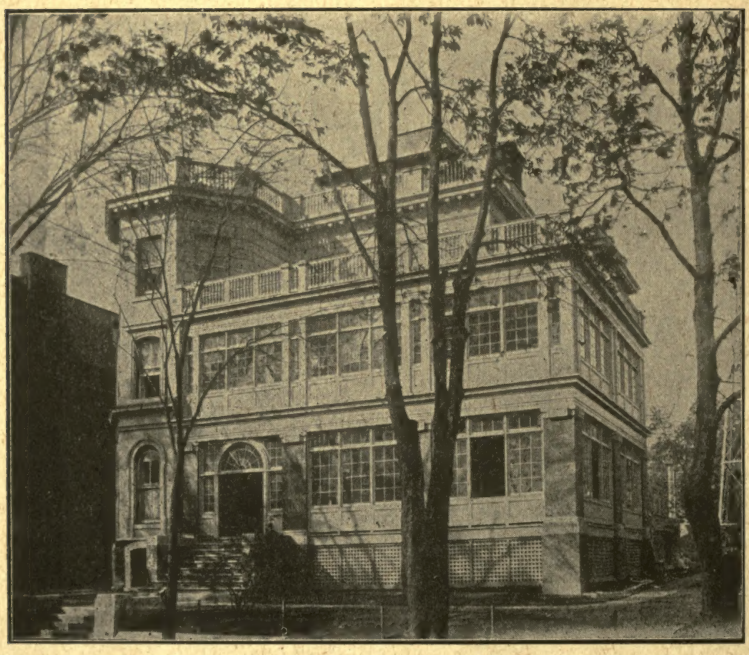

ROYAL EDWARD INSTITUTE, MONTREAL

PROVINCE OF QUEBEC

GEORGE THE FIFTH, by the Grace of God, of the United Kingdom of Great Britain and Ireland and of the British Dominions beyond the Seas, KING, Defender of the Faith, Emperor of India.

To Messrs. E. Persillier Lachapelle, J. George Adami, Thomas Roddick, Hon. James J. Guerin, J. Edmond Dubé, Elzéar Pelletier, and Joseph Lespérance, physicians ; Charles M. Holt, advocate and King's Counsel, and Jeffrey Burland, of the City of Montreal; Messrs. Michael J. Ahern, Charles R. Paquin, Arthur Simard and Arthur Rousseau, physicians of the City of Quebec, and G. Bourgeois, physician of the City of Three Rivers. Greeting:

Know ye that, reposing trust and confidence in your loyalty, integrity and ability. We, of Our especial grace, certain knowledge and mere motion, have nominated, constituted and appointed, and by these presents do nominate, constitute and appoint you the said E. Persillier Lachapelle, J. George Adami, Thomas G. Roddick, James J. Guerin, J. Edmond Dubé, Elzéar Pelletier, Joseph Lespérance, Charles M. Holt, Jeffrey Burland, Michael J. Ahern, Charles R. Paquin, Arthur Simard, Arthur Rousseau, and G. Bourgeois, Royal Commissioners for the purpose of ascertaining practical means for combating the spread of tuberculosis; Dr. E. P. Lachapelle, to be Chairman of the said Commission.

To have, hold, exercise and enjoy the said office of Commissioners with all and every the powers, authority, privileges, emoluments and advantages to the said office of right and by law appertaining during Our Royal pleasure.

In testimony whereof, We have caused these Our Letters to be made Patent and the Great Seal of Our said Province of Quebec to be hereunto affixed. Witness, Our Right Trusty and Well Beloved the Honorable Sir C. Alphonse Pantaléon Pelletier, Knight Commander of Our Most Distinguished Order of St. Michael and St. George, Member of Our Privy Council for Canada, Lieutenant Governor of Our said Province of Quebec.

At Our Government House, in Our City of Quebec, in Our said Province, this ninth day of August, in the year of Our Lord, one thousand nine hundred and nine, and in the ninth year of Our Reign.

By Command,

L. RODOLPHE ROY,
Secretary.

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PREFACE

Letter to the Lieutenant Governor

Montreal, 31st December, 1910.

To His Honour the Lieutenant-Governor in Council,

The Royal Commission appointed by you on the 9th. August, 1909, under articles 596 and following of the Revised Statutes of Quebec, to seek practical means of arresting the spread of tuberculosis, have the honour to submit the annexed report.

As it is necessarily a voluminous one, owing to the extent and complex nature of the subject under consideration, we deemed it our duty to submit, first of all, a summary containing the more important conclusions and recommendations without leaving it to be inferred, however, that the others are of no importance.

The report is divided into four chapters. The first shows, by statistics, the extent of the disease in our Province and the economic losses it entails. The second deals with the social causes of tuberculosis and the causes peculiar to the Province of Quebec. The third contains an enumeration of the practical means suggested by the Commission for combating tuberculosis. The fourth gives some examples of the measures adopted by certain other countries to effectively combat the disease. These examples should rouse all who have any responsibility in connection with the campaign against tuberculosis and facilitate the Government's task.

GENERAL CONCLUSIONS

1. Tuberculosis is an infectious and transmissible disease due to a special bacillus.

2. The experience of all civilized nations shows that tuberculosis is avoidable like all other infectious diseases.

3. Tuberculosis is responsible for a mortality one third higher than that of all other ordinary contagious diseases combined. (Chap. I, p. 15). The mortality from tuberculosis in the Province of Quebec is higher than that of the Province of Ontario and of the adjacent United States. (Chap. I, p. 31). While, in many other countries, mortality from tuberculosis decreases from 40 to 50 per cent, as the result of a well organized campaign, ours remains stationary. (Chap. I, p. 28).

4. The death rate from tuberculosis among our rural population, too nearly equals that of the urban population who live under much more anti-hygienic conditions. The explanation of this is given in Chapter I, p. 17 and Chapter II, p. 79.

5. The higher death-rate from tuberculosis among our women is a fact peculiar to our Province for, in all other countries, man pays a greater tribute to tuberculosis. (Chap. I, p. 19, and Chap. II, p. 67).

6. Finally, statistics show that more French Canadians die of tuberculosis than Anglo-Canadians. (Chap. I, p. 18, and Chap. II, p. 67).

7. To get an idea of the gravity of this disease, not only the death rate should be taken into consideration, but also the morbidity, that is the great number of individuals more or less affected by it. It may be asserted that, in manufacturing centres, for each individual who dies of tuberculosis, three at least are sufficiently attacked by it to be affected in their capacity for work.

8. And to have a still more accurate idea of the gravity of tuberculosis as a social plague, its economic aspect must be considered. This is done in Chapter I, p. 37. Most of its victims are between 20 and 45 years of age, when the human life has the greatest economic and national value. Taking as a basis the calculations made by experts elsewhere, it may be asserted that the Province of Quebec loses about $20,000,000.00 yearly.

PREPONDERANT CAUSES

The almost general ignorance of the infectious nature of tuberculosis : contagion in families, in collective life in school, boarding schools, offices and workshops; the preparation of the organism for infection by vitiated air in all places where people are gathered together, by unhealthy dwellings, alcoholism, premature labor of children and excessive labor of adults in certain industries, and by dusty trades.

MEANS FOR COMBATING TUBERCULOSIS

As infection or contagion is the essential and direct cause of this disease, the chief means are evidently those directed to prevent infection or contagion. But, inasmuch as such infection, according to the general rule, develops only in weakened organisms, unless the infection be massive, the predisposing causes must likewise be taken into account and be warded off as much as possible.

Such means are thus divided into two classes:—1. those against the disease itself and its methods of propagation; 2. those against the predisposing causes of social origin. (Chap. II, p. 42-56).

A.—MEASURES TO BE TAKEN AGAINST THE DISEASE ITSELF.

1. **Educational Campaign.** — People must be taught that tuberculosis is an infectious and consequently an avoidable disease; that it is transmitted by the expectoration of patients in an advanced stage and one must protect oneself against this chief source of the disease. Once these fundamental ideas are fully grasped by the people, the latter will become the principal factor in the anti-tuberculosis campaign. Such education should be begun in school by teaching the chief elements of hygiene, and be afterward continued among the people by various means, such as the distribution of printed matter, articles in the newspapers, lectures, etc. (Chap. III, p. 99).

2. **Compulsory Notification of Tuberculosis.** — This is required by the Quebec Public Health Act, but it is not enforced. Therefore, in Chap. III, p. 86, the Commission suggest some means to make it effective. This notification is of the highest importance, because it alone permits:—1. of the foci of the disease being known; 2. of disinfecting the contaminated dwellings and thereby protecting the health of new tenants.

3. **Compulsory Disinfection of Dwellings** which tuberculous persons have left, because it is proved that an infected house can transmit tuberculosis. (Chap. II' p. 58, Chap. III' p. 94).

4. **By-laws forbidding expectoration in public places,** because the sputa of tuberculosis patients may contain millions of bacilli which, mingled with the dust, infect persons inhaling such dust. In some cities, such by-laws have already produced a marked change as regards the filthy and dangerous habit of spitting everywhere. Public opinion being in favor of such by-laws, it would now be easy, thanks to the education already imparted, to have them more vigorously applied. (Chap. III, p. 87).

5. **Anti-tuberculosis dispensaries.** — The dispensary is the most important instrument in the anti-tuberculosis armament, and this is becoming more and more acknowledged by the nations that have undertaken the campaign against tuberculosis. In fact, it combines many qualities; it is at once an instrument of popular education, of prophylaxis, of treatment and of as-

sistance; it reaches the greatest number of patients and does the greatest amount of good at a minimum expense, because it is not a costly institution. Through the allurement of free treatment for all diseases of the respiratory organs and of assistance to the needy, the dispensary attracts many sick, diagnoses contagious cases and causes them to take precautions; makes a judicious selection of the advanced cases to be sent to the hospital; sends nurses to visit the patients in their homes, who instruct the families and find out other patients in need of treatment; supplies hygienic spittoons, antiseptics and food; keeps track of patients when they leave the sanatorium and is a valuable source of information for the Board of Health. (Chap. III, p. 88).

6. **Isolation of open cases of tuberculosis,** because the infection of man by man is the chief source of the spread of tuberculosis. This disease is said to be open when the organ attacked, more frequently the lung, throws out the bacillus. If all such cases could be known and isolated, it would be easy to overcome tuberculosis, for, by isolating a single case of open tuberculosis, a focus of contamination for many other individuals is removed. If only one-tenth of such patients in an advanced stage of the disease could be isolated and their dwellings disinfected, we could count on a decrease of 10 per cent. in the mortality from tuberculosis in the space of three years. It is therefore of the greatest importance that provision be made for the isolation of such open cases of tuberculosis. (Chap. III, p. 89).

B.—MEASURES AGAINST PREDISPOSING CAUSES.

1. **Medical inspection of schools and industrial establishments.** — The medical inspection of schools and of establishments where people work in common offers great advantages; in the first place, it is an excellent method of educating the people, and also a means of enforcing the application of the health by-laws. It will remove three great caluses of tuberculosis:—want of ventilation, overcrowding and the absence of precautions against contagion. Medical inspection is the only way to quickly improve the anti-hygienic conditions under which too many school children and work people live. (Chap. III, p. 97).

2. **Condemning of unhealthy dwellings.** — It is clearly proved that dark, damp, crowded and dirty houses are real hot-beds of tuberculosis. (Chap. II, p. 58). Unhealthy dwellings have, in fact, such an influence on the preservation of tuberculosis in certain blocks of houses or in certain wards, that tuberculosis has been said to be a house disease. Damp and dark dwellings are a great factor in tuberculosis among our people, and overcrowded and dirty dwellings are the same among immigrants. (Chap. II, p. 57; Chap. III, p. 92).

3. **Campaign against alcoholism.** — Although the Province of Quebec can compare to advantage with other civilized countries as regards the consumption of alcohol, it must, nevertheless, be admitted that alcoholism exists

and is, beyond a doubt, a direct and indirect predisposing cause of tuberculosis. The Commission are of opinion that the Government can do a great deal towards lessening the evil done to people by alcohol. (Chap. III, p. 96).

4. **Establishment of preventariums.** — The preventarium, although only a subsidiary means, is nevertheless really important. It is an institution where convalescents after certain acute diseases which particularly predispose to tuberculosis, follow a sanatorium treatment to fortify themselves against the attacks of that disease which threatens persons whose constitutions have been weakened. As a rule, those who keep in good health resist infection, unless it be massive or too prolonged.

5. **Open air schools.** — Experiments made in Germany and in the United States show that children who are weak, anaemic and predisposed to tuberculosis undergo a complete change in a short time by means of open air schools. The Commission strongly recommend this measure. (Chap. IV, p. 135).

6. **Vacation colonies.**—Giving children, who are wasting away in cities, an opportunity of breathing pure country air for at least a fortnight, is an excellent way of restoring their vitality and power of resistance.

It must not be inferred from the enumeration of the above measures that the Commission attach equal importance to all, nor that they urge the Government to undertake to carry them out. At page 111, chapter III, the Commission have defined the responsibilities of the State, of municipalities, of philantrophy and of individual citizens for the anti-tuberculosis campaign protects the whole of society, and therefore concerns all the social powers.

The Commission wish also to observe that certain measures can be carried out at once, while others require the aid of time and persevering efforts.

MEASURES THAT CAN BE CARRIED OUT AT ONCE

1. Stricter application of the laws contained in the Statutes and directed against tuberculosis;

2. Elementary teaching of hygiene in schools, normal schools and other educational institutions;

3. Education of the people under the direction of the Board of Health. (Chap. III, p. 102);

4. Medical inspection of schools and industrial establishments;

5. Establishment and maintenance of anti-tuberculosis dispensaries in the principal centres of the Province;

6. Insolation of advanced cases among the poor. (Chap. III, p. 89);

7. Establishment of open air schools for children who are weak and predisposed to tuberculosis; (Chap. IV, p. 135).

8. Treatment of curable cases by the class method because it is proved

that its results can almost compare with those of the sanatoriums and it is much more economical; it also leaves the patients the consolation of remaining with their families. This method of treatment suits poor people and the sanatorium suits those who have means. The sanatorium becomes indispensable when the patients, in rural districts, cannot be treated either by the dispensary or by the class method, or when it is desired to make it a means of educating the people; (Chap. IV, p. 130);

9. Legislation preventing the premature labor of children. (Chap. III p. 102);

10. Investigation regarding the working hours of adults in industrial establishments;

11. Legislation against alcoholism;

12. Inspection of meat and control of the sale of milk.

MEASURES TO BE CARRIED OUT GRADUALLY

1. Establishment of preventariums;

2. Creation of sanatoriums. (Chap. III, p. 106);

3. Farm and vacation colonies. (Chap. III, p. 104-108);

4. Improvement of dwellings and legislation to promote the building of cheap, healthy dwellings for the working classes;

5. Legislation to promote improvement in the hygiene of cities and towns and of hygiene generally throughout the Province.

RECOMMENDATIONS TO THE GOVERNMENT

Finally, the Commission respectfully submit to His Honor the Lieutenant Governor in Council, the following recommendations, which relate especially to the share the Government should take in the campaign against tuberculosis:

1. That very explicit instructions be given to the Provincial Board of Health, to municipalities and other duly constituted authorities to enforce the regulations respecting the compulsory notification of tuberculosis, the disinfection of contaminated premises, the healthy condition of dwellings, schools and industrial establishments; and that such authorities be actively assisted by the law officers when compelled to enforce such regulations;

2. That the Provincial Board of Health be the central authority which will direct the application of the means of combating tuberculosis and, to that end, that it be given a sufficient appropriation to establish a special department for tuberculosis with the necessary staff. That department should be under the direction of a **physician of acknowledged competence in the matter,** who would apply all the educational means mentioned in the report. (Chap. III, p. 115), inspect the anti-tuberculosis institutions and strive to have

others established to complete the anti-tuberculosis armament, compile statistics and submit a yearly report on his administration and on the resulsts of the campaign against tuberculosis;

3. That in every municipality or union of municipalities, where there is a chartered anti-tuberculosis association, the Government, on a favorable report of the Provincial Board of Health, contribute a proportionate amount (to be determined) towards the cost and maintenance of every established dispensary and empower the municipalities served by such dispensaries to contribute an equal amount towards their erection and maintenance;

4. That the Government contribute a proportionate amount (to be determined) towards the establishment of isolation hospitals or the construction of special pavilions in existing hospitals receiving advanced cases of tuberculosis among the poor and empower the municipalities served by such isolation hospitals or pavilions, to contribute to their erection and maintenance;

5. That the Government contribute a certain amount (to be determined) towards the maintenance of advanced cases of tuberculosis among the poor, in special hospitals or pavilions, by distributing that amount "pro rata" at so much per head and per week. (Chap. IV, p. 89) and empower municipalities to also contribute in the same manner to the same object;

6. That the Government take the necessary measures for the medical inspection of schools, the inspectors to report, not only to their municipalities, but also to the Provincial Board of Health, as to the health of the pupils, the ventilation and sanitary condition of the school; and, moreover, that the Provincial Board of Health be empowered to inspect the schools throughout the Province and make other such changes as they may deem necessary to make the school healthy;

7. That the Government appoint duly qualified inspectors to report on the sanitary condition of all industrial establishments where collective work is done, such as factories, business and government offices, and that the present legislation, which should be completed if necessary, be enforced in order to secure the healthfulness of establishments where collective work is done;

8. That the Government adopt legislation to protect children from premature labor as requested by the Commission. (Chap. III, p. 98);

9. That the Government have an investigation made respecting the number of working hours per day in the various industries of the Province, in order to ascertain whether the number of working hours is excessive in some of them and to remedy this by proper legislation. (Chap. III, p. 99);

10. That the Government appoint a Provincial veterinary surgeon to be attached to the Department of Agriculture, who would be the official adviser of Municipal inspectors and farmers interested in the milk trade, distribute tuberculin and control its application; in a word, carry on an educational campaign aginst bovine tuberculosis.

The whole respectfully submitted.

(Signed), E. P. LACHAPELLE, Chairman.
" J. GEORGE ADAMI,
" MICHAEL JOS. AHERN,
" GEO. BOURGEOIS,
" JEFFREY H. BURLAND,
" JOS. EDM. DUBE,
" CHARLES M. HOLT,
" JAS. J. GUERIN,
" JOS. LESPERANCE,
" C. R. PAQUIN,
" ELZEAR PELLETIER,
" T. G. RODDICK,
" ARTHUR ROUSSEAU,
" ARTHUR SIMARD,
" C. N. VALIN,

Reporting Secretary

Report of the Royal Commission on Tuberculosis

CHAPTER I

ON THE EXTENT AND ECONOMIC IMPORTANCE OF THE RAVAGES CAUSED BY TUBERCULOSIS IN THE PROVINCE OF QUEBEC

We have to depend upon statistics to give a clear appreciation of the extent of the ravages caused by tuberculosis. Without such appreciation, this report and its conclusions would largely lose their significancy. We must, therefore, begin by indicating from official statistics the replies to the following questions:

How do the effects of tuberculosis compare with those of other infectious diseases against which our modern society strives to protect itself?

What place does tuberculosis occupy in the mortality tables of the province?

It is a disease which affects the whole population, telling upon rural as well as upon urban population?

Of the two great races which in the main compose our population, which pays the heavier tribute to the disease?

Of the two sexes, which contributes the greater number of victims?

What life period furnishes the greatest number of victims?

In which professions or occupations do we find the greatest mortality from this disease?

Are there any counties which are free from the disease, or is it spread throughout the whole province?

Is the mortality evenly spread throughout the twelve months or are there certain seasons when it is more marked than at others, suggesting that climate and seasonal variations play some part in the production of the disease?

Is phtisis or pulmonary tuberculosis the one serious form of the disease, or are they other forms of tuberculosis which also contribute to the mortality tables?

Are there indications that the disease in our province, as in many other countries, is showing a tendency towards diminishing in frequency, or is it stationary or advancing?

How does our province stand when we compare our statistics with those of other provinces of the Dominion, of England, the United States and other countries?

Can we regard these statistics as reliable or as affording a correct idea of the extent and the importance of the disease?

Finally, putting aside the morbidity and the mortality for which tuberculosis is responsible, is there any evidence that this disease plays further an important part as a result of its economic, social and national consequences?

This is a long list, but it will be recognized that it is most important, not to say essential, that these matters be investigated and answers given to each of these questions.

1.—Tuberculosis as compared with other infectious diseases.

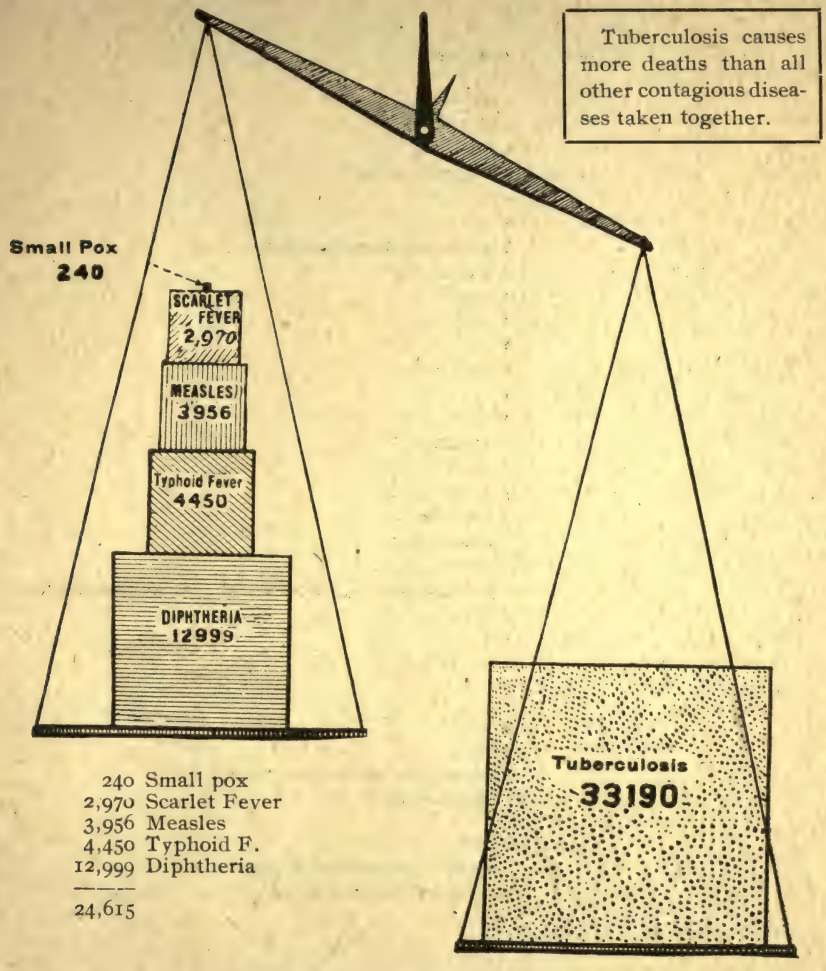
How do the ravages of tuberculosis compare with those of other infectious diseases?

In the first place it may be noted that this comparison is perfectly legitimate since all admit now-a-days that tuberculosis spreads by infection; for instance, it has been proved that it is due to the growth in the body of one particular form of micro-organism and that experimentally, by the inoculation of this one particular organism into domestic animals, the disease can be spread from individual to individual.

It is a matter of universal knowledge that all civilized countries of to-day have their codes or sanitary laws, the principal function of which is to prevent the spread of infectious diseases, and that, because these diseases are causes of high mortality, at times, indeed, of most fatal epidemics; because the economic consequences are most serious, and, lastly, because we know that infectious disease is a preventable disease, it is, therefore if interest to know to what extent infectious diseases in general, and tuberculosis in particular, are responsible for death ocurring in our Province.

The following diagram, based upon the statistics of ten years, — from 1896 to 1906 — shows that while the commonest, most important and widespread epidemic diseases, small pox, scarlet fever, measles, typhoid and diphtheria, all combined, were the cause of 24,615 deaths, tuberculosis had placed to its account 33,190 victims.

TUBERCULOSIS STATISTICS OF THE PROVINCE OF QUEBEC



240 Small pox
2,970 Scarlet Fever
3,956 Measles
4,450 Typhoid F.
12,999 Diphtheria

24,615

Statistics of eleven years, 1896-1906

Clearly thus tuberculosis is responsible for 8475 more deaths than all other "contagious diseases" combined. This appalling preponderance of tuberculosis has inevitably been the source of profound anxiety among physicians, economists and philanthropists, and, inevitably, is a matter of concern for our public bodies.

Mortality from tuberculosis compared with all other main causes of death.

It is scarcely nelessary to say that infertious diseases are not the only causes of death: there are numerous other causes. Comparing these, what place is taken by tuberculosis?

The following diagram, based upon the deaths in the province during the year 1906, affords us the necessary information.

Deaths of the year 1906, distributed according to diseases

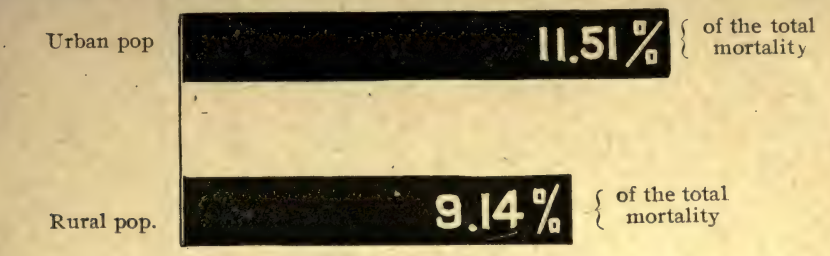
Typhoid fever 495
Small-pox 9
Measles 355
Scarlet Fever 48
Whooping cough 503
Diphtheria 908
Influenza 120
Other epidemic diseases 131
Tuberculosis 2935
Cancers and other malig. tumors 711
Diabetes 99
Meningitis (simple) 895
Encephalitis 121
Congest. hemorrh. and softening of the brain 485
General paralysis 43
Péricarditis and endocarditis 175
Organic disease of the heart 934
Acute Bronchitis 507
Chronic Bronchitis 132
Pneumonia 1068
Other diseases of respiratory organs 1262
Dis. of stomach (cancer except.) 488
Diarrhœa & enteritis (un. 2 yrs. 5180
Hernia and intestinal obstruct.) 118
Cirrhosis of liver 103
Nephritis and Bright's disease 514
Non canc. tum. & other diseases of fem genit orgaus 86
Puerperal septicemia 106
Other puerperal accidents 123
Cong. debility and malformat ons 3163
Senile debility 1058
Suicides 18
Other violent deaths 689
Other diseases 3149
Unknown or non-specified diseases 3269

This diagram shows that, **next to infantile diarrhoea, tuberculosis is of all specific diseases the most important cause of death,** and here it deserves note that a considerable proportion of the deaths reported as being due to congenital weakness, abnormalities, unknown and non specified diseases, are truly due to a parental tuberculosis, this disease being associated with syphilis and alcoholism in this respect.

3.—Tuberculosis in urban and rural districts, respectively.

The following diagram, while showing that city conditions are somewhat more unfavorable, shows more particularly that the **mortality in our rural population is not very much less than in urban districts.**

Contribution of Tuberculosis to the Total Mortality during eleven years (1896-1906)



On 95,867 deaths registered for urban populations, 11,036 were due to tuberculosis.
On 242,193 deaths registered for rural populations, 22,154 were due to tuberculosis.

Comparing the conditions in which the dwellers in the country and in the cities live and work, a greater difference might well be expected. In the larger cities everything would seem unfavorable to good health, — dusty and smoky atmosphere, dwellings rendered unhealthy by being crowded together, lack of sunshine and of air, exhausting work. In the country, on the other hand, where there is abundant pure air and sunshine, work, rather than being exhausting, is of a strengthening nature. Nevertheless, there is this little difference between the two figurs.

The only explanation must be that the country dwellers either know or care less about profiting from their surroundings; that they are heedless of the ordinary laws of health and neglect to apply those laws to a greater extent than do the town dwellers. That this is a right explanation is proved by a fact determined in the United States, namely, that diminishing of the tuberculosis mortality is more pronounced in the towns than it is in the country districts. Town dwellers, in short, are better informed, they see and understand more fully the advantages of good hygiene and acting upon this knowledge they are more ready to improve their conditions of life.

4.—Incidents of tuberculosis in the different districts of the Province

Does tuberculosis spare any part of the Province?

The following tables show that in the Province of Quebec, at least, there **are no geographical or climatic conditions which have hindered the spread of the disease... Tuberculosis is found in every county, with more or less intensity.**

(Statistics of eleven years.)

Of 100,000 living, how many die from Tuberculosis, each county taken separately ?

Argenteuil	75.7	Brome	119.7
Arthabaska	110.9	Chambly	186.4
Bagot	173.5	Champlain	192.3
Beauce	146.5	Chateauguay	164.1
Beauharnois	142.3	Charlevoix	137.0
Bellechasse	141.3	Chicoutimi and Lake St. John	124.1
Berthier	193.5	Compton	79.9
Bonaventure	113.0	Deux-Montagnes	223 9

Dorchester	128.1	Ottawa	90.2
Drummond	89.8	Pontiac	71.0
Gaspé	145.9	Portneuf	198.7
Hochelaga	288.3	Quebec (City)	217.0
Huntingdon	158.4	Quebec (County)	225.3
Iberville	212.8	Richelieu	177.6
Jacques Cartrer	194.5	Richmond	153.9
Joliette	180.1	Rimouski	175.9
Kamouraska	169 7	Rouville	125.3
Laprairie	233.7	Saguenay	173.7
L'Assomption	216.8	Shefford	136 1
Laval	256.8	Sherbrooke	162.1
Levis	198.8	Soulanges	147.8
L'Islet	190.3	Stanstead	117.6
Lotbinière	171.9	St. Hyacinthe	219.4
Maskinongé	203.7	St. Johns	145.5
Matane	133.4	St. Maurice	168.3
Mégantic	107 0	Témiscouata	127.4
Missisquoi	94.6	Terrebonne	143.5
Montcalm	170.3	Three-Rivers	283.4
Montmagny	196.5	Vaudreuil	166.3
Montmorency	190.6	Verchères	215.5
Montreal (City)	319.8	Wolfe	135.2
Napiervillee	158.3	Yamaska	231.2
Nicolet	198.6		

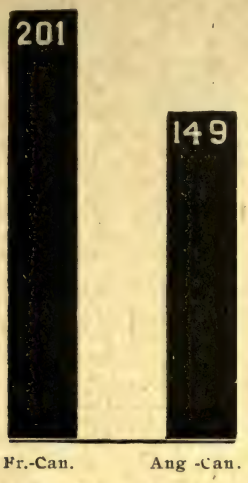
At most the above tables show that there are two conditions which influence the extension of the disease. Namely, the density of population and industrial work, for these two conditions eminently favor the two fundamental causes of tuberculosis, namely: (1) the direct cause, contagion, and, (2) the indirect or predisposing cause, lowering of vitality in the individual It is for these reasons that the towns and cities present a higher tuberculosis mortality, and, if we note that in certain counties the tuberculosis mortality is particularly high, a careful study of all the possible factors convinces the Commission that these figures receive their explanation from the ignorance of the population regarding the familial infectivity of this disease, their ignorance or neglect of the simplest laws of hygiene, along with, very possibly a certain amount of hereditary predisposition to disease, brought about by the intermarriage between those of the same village or restricted district, of individuals, that is, who are apt to be closely related. In one or two cases the presence of factories explains the high comparative mortality of particular counties.

5.—Incidence among French-Canadians and Anglo-Canadians respectively.

Is there any difference to be made out between the effect of the disease upon French-Canadians and English-speaking Canadians respectively?

The following table demonstrates that there is a striking difference.

For 100,00 English-Canadians and for 100,000 French-Canadians, how maney deaths from tuberculosis ; average from the years (1891-1906, year 1905 omitted)?



It will be seen that **the mortality is at least a quarter as much among the French-Canadians than among Anglo-Canadians;** and, if it be so, then our French-Canadian citizens more particularly must take an active part in this fight against tuberculosis. But in the first place it is necessary to know the causes of this greater incidence in this section of our population, because it is only by knowing the causes that we can successively combat the disease. Without entering fully into all the details, some of which will be noted in chapter II, we may usefully note what appears to the Commission to be the main factor, namely, the greater poverty of our French-Canadian population. they form the greater number of artisans and laborers, and on this account are more exposed to the unhygienic influences of industrial work; they live in houses which in every respect are less hygienic; they are ignorant of, or neglect, many of the simplest rules of health. The Anglo-Canadian population, fill the better industrial posts, which, at the same time, are more hygienic and better paid. Their dwellings are more healthy. They take greater care to apply the laws of health.

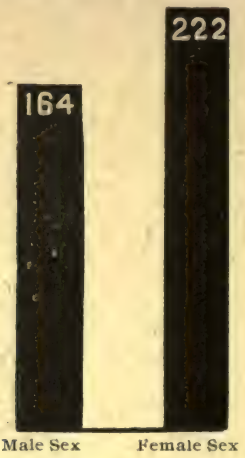
To reduce this relatively high mortality among the French-Canadians, it is obvious, therefore, that the fight against the disease must primarily be directed (1) towards he improvement of the conditions of industrial work: (2) towards the improvement of the dwellings of the working classes, and (3) towards the education of the people in the laws of health.

6.—Incidence of the disease in the two sexes.

Are men or women more particularly affected by the disease?

The following diagram demonstrates that the **female sex contributes more to the mortality, and that to a very noticeable degree.**

For 100,000 inhabitants of each sex, how many deaths from tuberculosis; average for ten years, (1896-1906, year 1905 omitted)?



Your Commission would call particular attention to this matter. This preponderance of mortality in the female sex is peculiar to our province. With the exception, perhaps, of Ontario, the statistics of other countries show, one after the other, that the tuberculosis mortality among women is less than it is among men. Thus, for example, **in the Province of Quebec, of 100,000 inhabitants, 222 women die of tuberculosis as compared with only 103 in England. The mortality is more than twice as much. In France also the female sex affords a tuberculosis mortality between two and three times less than that afforded by men.**

It is indeed only to be expected that men being more exposed to the harmful influences of industrial work, and more addicted to alcohol, should pay a heavier tribute to the disease. How, then, are we to explain this extraordinary feminine mortality in our Province? In the first place, it is to be noted that during the six long winter months women live far too much immured in the house, and far too often, to preserve warmth, those houses are almost sealed. Even during the summer it is the custom to have the windows firmly closed and the blinds down so as to keep the air within cool. Neither pure air nor sunlight are allowed to enter freely into the houses. This long sojourn in a confined atmosphere cannot but lower the vitality and diminish the resistance to the contagion. Indeed even where the household conditions are hygienic, the lack of exercise in the open must render the individual more susceptible to the infection. So also it must be noted, as a general rule, that the clothing of the female sex does not adequately protect it against the winter cold, and when they leave the warm houses, women imperfectly protected are liable to become chilled. Without perhaps knowing sufficiently the exact mode of action of sudden cooling upon the body, it is now well accepted that this predisposes to infection of various orders.

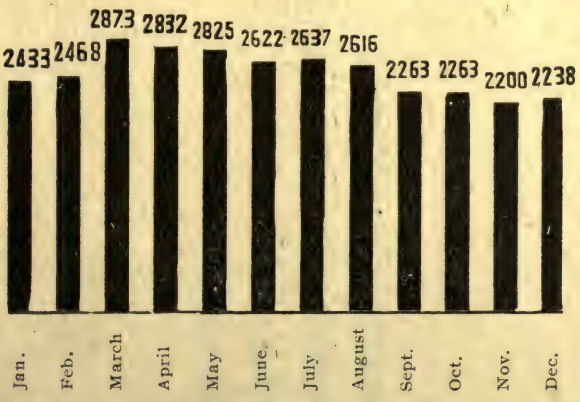
Serious neglect of hygienic precautions in the days immediately following childbirth, results in a pronounced lowering of vitality. There is a constant

drain upon the force, a lowered resistance against tuberculous infection. And, if, possible, this great incidence of tuberculosis mortality in the female sex in our province assumes a yet greater importance when it is considered that within the narrow dwelling the mother lives daily and hourly with the young children, and, if herself infected with tuberculosis, must almost inevitably convey the disease to the next generation by infection, while, also, the children born to these weakly mothers must themselves be feeble and predisposed. Here, indeed, we would seem to have a main cause for the steady spread of this disease in our population.

7.—Climate and tuberculosis.

Is the climate in this province a factor? Climate plays a large part in our lives in the province of Quebec, because of its extremes beween the long and severe winter and the brilliant summer months, and almost inevitably one looks to those great variations and their results as playing an important part in this matter of the spread of tuberculosis. Nevertheless, it is well known that tuberculosis may show itself — and may be healed — in every climate, and as regards our province, the following diagram shows **that the tuberculosis mortality presents very little variation throughout the course of the twelve months,** but is slightly more marked in the milder months.

Deaths from tuberculosis during ten years, (from 1896 to 1096, year 1905 omitted) distributed by months.



At most there is to be observed some slight increase in the number of deaths with the onset of the damper months of March, April and May. The mortality is at its lowest from September to February. Why this should be so, possibly needs explanation, for it is contrary to expectation that the mortality should be least in the cooler months. This apparently paradoxical result may possibly be explained by regarding the deaths occuring during the spring and summer, not as directly due to the mildness of these seasons, but as the outcome of influences which had affected the organism during the autumn and winter, the disease being one of slow progress. On the other hand, it has to be remembered that, as a matter of general experience, at

sanatoriums, patients progress more favorably during the colder winter months than during the summer months.

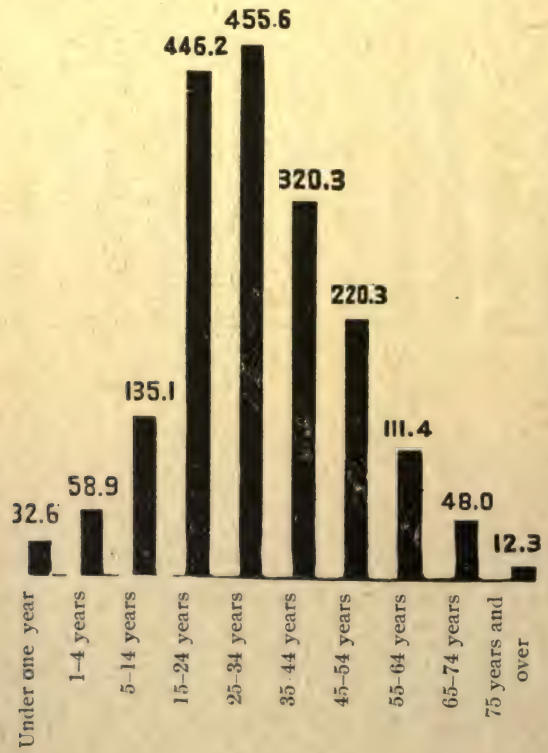
Here we would quote the saying of Dr. Trudeau: "It is not so much where the consumptive lives, as how he lives, that is of the most importance." It is not so much that the cold months prepare for the disease which ends fatally during the milder months, it is the manner in which the patient lives during the winter. Indeed, the influence of cold is tonic and invigorating, but the ordinary individual lives in winter in rooms that are overheated and imperfectly ventilated. Practically the whole of our population most unfortunately ignore the harmful influence of confined air and the great benefit to be derived from pure air. Where, practically, all sin, the French-Canadian members of our population are the greatest sinners.

8.—Age incidents of tuberculosis.

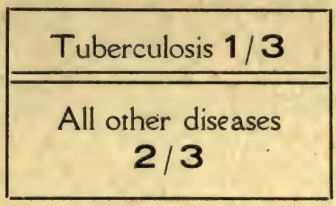
What age furnishes the greatest number of victims to the disease?

The diagram below **shows the greatest mortality from tuberculosis to be found between the ages of twenty-four and thirty-four, next between fifteen and twenty-four, last between forty-five and fifty-four.**

For each age-period, how many deaths from tuberculosis on 1,000 deaths from all causes in the year 1901. (From the federal census 1901)?



It deserves note that **one-third of all the deaths from tuberculosis occur between the ages of twenty and forty-five,** that is, during the period when human life has the greatest economic value.



It is this fact that makes the disease specially grave from economical, social and national aspects. Tuberculosis takes its heaviest toll just at that period of life when man has need of all his strength and all his activity. What adds another element of heavy weight is that tuberculosis before causing death, renders its victim weak and enfeebles him progressively, renders him useless to the community and incapable of work, and as a consequence makes him a charge upon the family and upon the community.

The above diagram shows us further, that, contrary to what is popularly believed, there does not exist an age beyond which the individual is protected against this disease. It is seen that tuberculosis is capable of attacking man at all life periods. It is true that it shows its effects especially during early adult life, and that then it is responsible for the third of the deaths. Nevertheless, it spares neither children nor the aged. The other commoner infectious diseases: measles, small-pox, typhoid, etc., show a much marked preference for particular life periods. This fact adds to the gravity of the disease.

9.—Occupation and tuberculosis.

What are the occupations which yield the greatest number of victims to the disease?

We have just noted that tuberculosis demands the heaviest toll in adult life, that is to say, during the working period. In this relationship it is interesting to know that there are certain groups of workers which are specially liable to succumb and, if there be such, it is possible that by proper regulation of industry this greater incidence might be arrested.

Unfortunately, official statistics for the province bearing upon this subject are almost wholly wanting. We have, therefore, to turn to the statistics of other countries and here our neighbors across the border may be appealed to. The results of a study by Miss Brandt in 1900, based upon condition in the United States, may be quoted.

Death rate from Consumption in different occupations

Per 100,000 living in the same occupation (Miss Brandt) 1900.

Marble and stone cutters	540.5
Cigar makers and tobacco workers	476.9
Plasterers and white washers	453.3

Compositors, printers and pressmen	435.9
Servants	430.3
Hat and cap makers	415.3
Bookkeepers, clerks and copyists	398.0
Laborers (not agricultural)	370.7
Tinners and tinware makers	365.3
Cabinet makers and upholsterers	359.1
Musicians and teachers of music	349.8
Glass blowers and glass workers	342.5
Barbers and hair dressers	334.9
Sailors, pilots, fishermen, oystermen	333.0
Painters, glaziers and varnishers	319.3
Leather makers	311.4
Apothecaries, pharmacists, etc	305.5
Coopers	299.5
Plumbers, gas and steamfitters	294.0
Masons (brick and stone)	293.9
Butchers	287.7
Saloon keepers, liquor dealers, bartenders, restaurant keepers	285.6
Livery stable keepers and hostlers	267.5
Draymen, hackmen, teamsters, etc	261.4
Boatmen and canalmen	256.8
Janitors and sextons	251.4
Hucksters and peddlers	250.9
Bakers and confectioners	250.1
Iron and steel workers	236.2
Carpenters and joiners	231.0
Engineers and firemen (not locomotive)	229.7
Leather workers	229.3
Tailors	218.2
Blacksmiths	212.9
Hotel and boarding house keepers	210.3
Mill and factory operatives (textile)	207.6
Machinists	195.9
Architects, artists, teachers of art	188.9
Gardners, florists, nurserymen and vine growers	186.6
Physicians and surgeons	168.8
Merchants and dealers	163.8
Engineers and surveyors	141.1
Lawyers	139.9
Teachers in school	144.0
Policemen, watchmen and detectives	136.7
Boot and shoemakers	135.5
Soldiers, sailors and marines (U. S.)	134.7
Collectors, auctioneers and agents	131.2

Steam railroad employees	129.8
Clergymen	123.5
Miners and quarrymen	120.9
Farmers, planters, farm laborers	111.7
Bankers, brokers, officials of companies	92.5

From a study of this table it becomes evident that the **death-rate from tuberculosis is highest among:** (1) **workers in dusty atmospheres,** as, for example, stone-masons, cigar-makers, plasterers, hatters, and servants; (2) **those working in association with their fellows, in offices,** for example, book-keepers, clerks copyists, telegraph and telephone employees, and those working in factories.

The statistics of all countries agree on this matter, that the dusty trades predispose to tuberculosis. Here, for example, could be afforded a classification of these trades according to their gravity, made by Mr. Frederick L. Hoffman and communicated to the Congress of Washington under the title of "Tuberculosis as an Industrial disease."

First Group.

Those exposed to metallic dust.

Smooth-grinders	out	of	100	deaths	49.2	were	due	to	tuberculosis
Polishers	"	"	"	"	38.7	"	"	"	"
Workers in copper	"	"	"	"	38.9	"	"	"	"
Tool makers	"	"	"	"	33.3	"	"	"	"
Jewellers	"	"	"	"	28.0	"	"	"	"
Engravers	"	"	"	"	34.9	"	"	"	"
Printers	"	"	"	"	38.6	"	"	"	"
Compositors	"	"	"	"	35.1	"	"	"	"

Second Group

Those exposed to mineral dust.

Stone-cutters	out	of	100	deaths	35.2	were	due	to	tuberculosis
Marble-cutters	"	"	"	"	28.0	"	"	"	"
Glass-blowers	"	"	"	"	30.1	"	"	"	"
Glass-cutters	"	"	"	"	34.5	"	"	"	"
Potters	"	"	"	"	31.1	"	"	"	"
Plasterers	"	"	"	"	23.6	"	"	"	"

Third Group

Those exposed to vegetable dust.

Spinners	out	of	100	deaths	29.6	were	due	to	tuberculosis
Weavers	"	"	"	"	27.8	"	"	"	"

Fourth Group

Those exposed to animal dust.

Furriers	out of 100 deaths				32.4	were due to tuberculosis			
Hatters	"	"	"	"	34.4	"	"	"	"
Wool-workers	"	"	"	"	24.5	"	"	"	"
Carpet-makers	"	"	"	"	23.9	"	"	"	"
Silk weavers	"	"	"	"	35.9	"	"	"	"
Upholsterers	"	"	"	"	31.0	"	"	"	"

Fifth Group.

Those exposed to organic dust.

Millers	out of 100 deaths				15.6	were due to tuberculosis			
Bakers	"	"	"	"	20.4	"	"	"	"
Button-makers	"	"	"	"	37.8	"	"	"	"
Leather-makers	"	"	"	"	32.0	"	"	"	"

Sixth Group.

Those exposed to dust from the streets.

Street-sweepers	out of 100 deaths				17.9	were due to tuberculosis			
Coachmen, carters	"	"	"	"	25.2	"	"	"	"
Postmen	"	"	"	"	27.7	"	"	"	"
Motormen	"	"	"	"	32.3	"	"	"	"

The figures given here afford only the mean mortality for all ages.

Now between twenty-five and thirty-four that mortality is very greatly increased, as, for example, for stone masons, if the figure here given is 49.2 per hundred, between twenty-five and thirty-four the percentage is 70.8. The same is true in other cases. It will be understood that actual workers are referred to. From these tables, between the ages of twenty-five and thirty-four **the tuberculosis mortality in these various dusty occupations varies from 38.9 to 87.5 per hundred, while the normal proportion, according to the estimates of Life Insurance companies is 31.8.** It may be added that these statistics are based on the tables of "Industrial Insurance Mortality Experience" for the ten years 1897 to 1906.

The above statistics are based purely upon figures of the tuberculosis mortality. If to these be added those representing the mortality from other diseases of the respiratory system, we gain most convincing evidence of the extraordinary harmful efects of dust; for example, **among stone masons mortality from tuberculosis and other diseases of the respiratory system combined is 66.4 per hundred.**

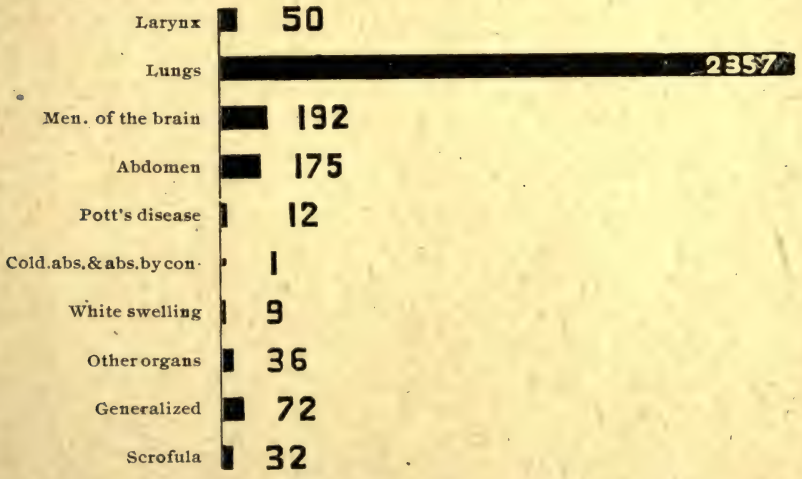
The general conclusion to be drawn is that it would be possible, by reducing to a minimum the spread of dust in the various industries, to reduce by half or two thirds the tuberculosis mortality in these various occupations. All that is needed is an appropriate, mechanical means of ventilation.

10.—The manifestations of tuberculosis in man and their relative danger.

Does phthisis cover or include all the fatal forms of the disease?

By the number of its victims in adult life, pulmonary tuberculosis attracts almost the whole popular attention so that the ordinary individual believes that there is no other form save phthisis. But this is incorrect, and leads to a wrong idea as to the true extent of the disease. That tuberculosis may affect, and affect fatally the other organs of the body, is shown in the following diagram:

Deaths from tuberculosis for one year (1906) distributed according to organs affected.



Now from this diagram it is quite evident that pulmonary tuberculosis, from the number of its victims, the age at which it kills them, and the way in which through the expectoration, it favors the infection, is the main cause of death. Nevertheless we cannot neglect the other forms.

11.—On the spread of the disease in the province.

Is tuberculosis increasing or diminishing in our province of Quebec?

This is of importance, more particularly when it is called to mind that in many countries during the last fifty years there has been a steady diminishing in the tuberculosis mortality, thanks to a proper condition of hygiene, and, we may add, to the wide spread development of anti-tuberculosis associations and their campaign. The following table tells us the developments in our province from 1896-1906.

Year	Tuberculosis
1896	2912
1897	3167
1898	3021
1899	3106
1900	3140
1901	3060
1902	2984
1903	3046
1904	2975
1905	2844
1906	2935
	33190

It will be seen that the **tables are almost the same from one year to the other. It may even be said that the last figures are higher than the first.** Practically, the tuberculosis mortality in the province is stationary. There is no general tendency for the ravages of the disease to be arrested. This for the province as a whole, but it is interesting to observe that in Montreal where for now some seven years the anti-tuberculosis league has been actively at work, the last years exhibit a noticeable and most satisfactory diminishing in the number of deaths from the disease, (figures from Dr. Harving and the City Board of Health).

Other figures bearing on this question are obtainable from the Insurance companies. Thus the Metropolitan Life Insurance company has presented to the Commission statistics which confirm the above, or even indeed tend to show that there is a definite increase throughout the province as a whole.

Death claims from tuberculosis in the Province of Quebec from 1896 to 1897

(Metropolitan Life Insurance Co.)

Year	Total Claims	Tuberculosis	Percentage on total.
1898	363	50	13.77
1899	481	63	13.09
1900	684	98	14.33
1901	1031	143	13.17
1902	1297	242	18.6
1903	1542	251	16.28
1904	1575	275	17.46
1905	1674	273	16.31
1906	1865	326	17.48
1907	1640	245	14.94
	12.152	1.966	16.18

Although the figures for 1907 show an improvement over those for 1906, they are, nevertheless higher than the initial figures for 1898. Taking the province as a whole, the conclusion is that no recognizable diminution is to be made out. Now in several other countries the figures are most distinctly undergoing reduction year by year through the well organized campaign against the disease, as, for example, the following diagrams show in England and Wales, Scotland and the United States that there is a diminution in the number of deaths from the disease.

Decrease in the Mortality from tuberculosis in England and Wales from 1851 to 1900 per 100,000 inhabitants.

Decades	Men	Women	Total.
1851 — 60	260	280	270
1861 — 70	250	250	250
1871 — 80	220	200	210
1881 — 90	180	160	170
1891 — 1900	150	120	130

Here note that the reduction is more marked among men than among women. Now in the Province of Quebec we have the opposite state of affairs We have already explained the reasons for this difference.

. London.

The death rate has considerably lowered notwithstanding the damp climate and the immense population of that city thus:

1897 .... per 100,000 inhabitants: 170
1901 .... per 100,000 inhabitants: 160
1906 .... per 100,000 inhabitants: 140. Decrease of 17.65 p. c.

Liverpool

The decrease is also very marked.

1856 — 65	per 100,000 inhabitants....	350.7
1866 — 75	" " "	333.9
1876 — 85	" " "	255.3
1886 — 95	" " "	212.9
1896 — 1905	" " "	182.7
1906 — 1907	" " "	162.7

Scotland.

Cities	Years: 1897	1901	1906
Edinburgh	190	170	110
Glasgow	203	185	156
Dundee	223	172	169
Aberdeen	167	139	122
Leith	212	192	127
Paisley	178	166	128
Greenock	207	148	132
Perth	221	161	179

United States

Those only which make out reliable statistics.

1880	per 100,000 inhabitants	326.2	
1890	" " "	267.9	
1900	" " "	201.2	
1907	" " "	183.6	Decrease, 24 p. c.

State of Massuchettes

1857 — 60	per 100,000 inhabitants.	469.9
1861 — 70	" " "	410.9
1871 — 80	" " "	391.5
1881 — 90	" " "	364.3
1891 — 1900	" " "	283.2
1900 — 1906	" " "	218.3

New York

1881 .. .. per 100,000 inhabitants: 427

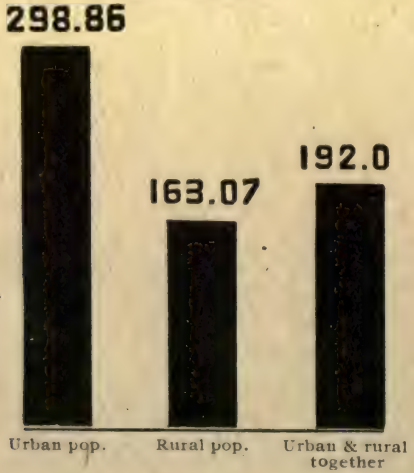
1903 .. .. per 100,000 inhabitants: 240. Decrease 44 p. c.

The City of Edinburgh gives an example of the most remarkable diminution.. Thanks to the organization directed by Dr. Philip, the figures have dropped 42% in ten years.

12. Continuing these comparisons between the province of Quebec and other countries that offer conditions of life which are comparable, we can gain a more exact idea of the real extent of the disease in our midst. Almost all statistics are based upon the mortality per 100,000 inhabitants.

Taking this as our standard, the following diagram shows that during the decade 1895-1906 the total mortality was 298.86 in our urban population, in our rural population 163.07 or 192 in the whole population. It will be observed, if reckoned thus, that there is a much more marked difference between the urban and the rural mortality than is shown by our previous figures.

For 100,000 inhabitants of the Province, how many deaths by tuberculosis; average for eleven years (1896-1906)?



It is interesting to compare Quebec with the other provinces of Canada in this respect. We here give a comparative table, taken from the census in 1901.

Mortaliy from tuberculosis in the Dominion for the decade ending on 31st. March 1901.

	Men	Women	Total
Ontario	1,593	1,951	3,544
Quebec	1,391	1,982	3,373
Nova Scotia	451	460	911
New Brunswick	266	273	539
British Columbia	171	115	286
Manitoba	167	215	382
Prince Edward Island	105	119	224
Alberta	83	85	168
East Assiboia	53	63	116
West Assiboia	7	11	18
Saskatchewan	44	54	98
Unorganized Territories	33	17	50
	4,364	5,345	9,709

Comparing the figures for Quebec and Ontario, respectively, it will be seen that the comparison is to our disadvantage. If the last column shows but a slight difference, it, will be seen by comparing the mortality with the population, that Ontario, with a population of half a million greater than that of our Province, has only 171 more deaths. It is obvious that our ratio is distinctly higher than theirs.

13.—Comparison with the United States.

Comparing our province with the States to the South nearest to us, the comparison is again to our disadvantage.

United States.

States	Mortality per 100,000 inhabitants (U. S. Census 1900)	
New-York	194.1	Province of Quebec, 192.
Rhode-Island	195.3	
Massachusetts	186.2	
New Jersey	180.1	
Maryland	169.4	
Connecticut	168.3	
Maine	164.9	
Vermont	152.5	
New-Hampshire	152.3	

It seems that only two of these have figures higher than the Province of Quebec.

14.—Comparison between Montreal and the Great Cities of United States.

These figures give the mean mortality for the United States during the decade of 1892-1902, and for Montreal for the decade 1896-1906.

Comparison between Montreal and American cities.

Cities	Mortality from tuberculosis:—
Montreal	319.8 per 100,000 inhabitants
Baltimore	223. " " "
Boston	245.9 " " "
Philadelphia	215.3 " " "
New-York	257.4 " " "
Chicago	140.5 " " "
Brooklyn	216. " " "
St-Louis	175.2 " " "

(Average in the United States for the decade 1892-1902 and in Montreal for the decade 1896-1906.)

It will be seen that **Montreal heads the list with a high mortality by far than that encountered in any of the American cities.**

15. — Province of Quebec compared with England and Wales.

The comparison with England and Wales is strikingly to our disadvantage, thus the tuberculosis mortality in 1904 in England and Wales per 100,000 inhabitants, was as follows:

Mortality from tuberculosis in 1904 in England and Wales per 100,000 inhabitants.

Age	Men	Women	Both
0	39	31	35
5	15	20	17
10	19	44	32
15	80	102	91
20	161	125	142
25	213	158	184
35	270	170	218
45	310	148	226
55	255	117	182
65	126	65	92
Average	146	103	124

Compare these figures with our own:—

ENGLAND. . . . . .146 males, 103 females, per 100,000 inhabitants
PROVINCE OF QUEBEC. 164 males, 222females, per 100,000 inhabitants

HOSPITAL FOR INCURABLES, NOTRE-DAME DE GRACE, MONTREAL.

So striking a difference affords food for serious thought. On the one hand, England has the great disadvantages of a damp climate, intensive industry and dense population, while, on the other hand, our climate is a healthy one, there is a less dense population and one more evenly divided between agriculture and manufactures.

16.—Comparison with Civilized Countries in General.

A comparison of this nature shows us that the Province of Quebec is among those countries which pay the heaviest tribute to tuberculosis. Thus, taking seventeen countries of which we have been able to obtain the mean mortality for the five years, from 1902-1907, we find,

France	336.	per	100,000	inhabitants
Austria	334.8	"	"	"
Servia	279.7	"	"	"
Ireland	215.3	"	"	"
Norway	196.4	"	"	"
Switzerland	192.	"	"	"
Prov. Quebec	188.6	"	"	"
Germany	185.8	"	"	"
United States	169.9	"	"	"
Spain	147.8	"	"	"
Japan	146.3	"	"	"
Scotland	144.5	"	"	"
Low Countries	133.0	"	"	"
England and Wales	121.5	"	"	"
Belgium	118.2	"	"	"
Italy	114.9	"	"	"
Australia	85.6	"	"	"

(average for five years from 1902 to 1907).

It follows from this that among these seventeen countries the Province of Quebec occupies the sixth place in order of greatest frequency. It is true there are five that are worse, but there are ten that are better. Pride alone should stimulate us to take a more respectable position, for what will it be when our population becomes more dense, more particularly as nowadays we judge the civilization of a people by the degree of perfection of its state of hygiene?

CONCLUSIONS

To epitomize, the study of general vital statistics demonstrates clearly:—

1. That tuberculosis alone claims more victims than all the other ordinary contagious diseases combined.

2. That after infantile diarrhoea it occupies the most important place in the table of general mortality.

3. That it lays a heavier tax upon urban population, while at the same time, it tells heavily upon the dwellers in the country.

4. That there is no part of our province that is spared.

5. That tuberculosis finds the most victims in the French-Canadian section of our population, and there particularly among our women.

6. That no period of the year is relatively free from deaths from the disease.

That it chooses its victims more particularly between the ages of twenty and forty-five, in a period, that is, when the economic value of life and human activity are at its greatest.

8. That the lungs especially are affected, but that other organs may be involved.

9. Taking our province as a whole, instead of statistics exhibiting a distinct diminution in its extent, such as is seen in many other countries, the mortality is stationary, if indeed it is not slightly advancing.

10. That in our province the disease claims a greater number of victims per 100,000 inhabitants than it does in the province of Ontario, in the neighboring States, in England, Italy, Belgium, Australia, Scotland, Japan, Spain, Germany, Holland, Hungary, Poland and yet other countries, so that as a matter of fact the **province of Quebec must be placed among those countries which pay the heaviest tribute to tuberculosis.**

Discussion.

It is deserving of consideration that the preceding figures, striking as they are, do not give an exact idea of the full extent of the disease and of the seriousness of the ravages caused by it. And this because, in the first place, statistics of every order are apt to approximate and not to state the full truth: and because, in the second place, all statistics of the province of Quebec are particularly defective. They are defective in principle, because we have not as yet developed complete organization of their record after a thoroughly scientifical manner and their function is defective, (1) because the law providing for obligatory declaring of the existence of tuberculosis is either unknown or not regarded; (2) because among numerous false diagnoses, made either through ignorance or from a desire to please the families of patients, the statistics are rendered inadequate, not to say false, by masking the presence of the disease. Nearly half the death certificates in the Province are signed by other than medical men, either by parish priests, or by witnesses of one or other order. Perhaps such a defective notification is inevitable in remote country districts and isolated farmsteads. Nevertheless, the extremely high proportion of these cases indicates defects of a more serious nature.

We give in the following table official evidence regarding these defective certificates.

Abstract from an Official Rport of the Provincial Board of Health in the year 1903.

Total of Certificates received	Signed by physicians	Signed by parish priests	Signed by witnesses	Not signed
15,671	8,269	6,906	217	279

It is to be seen that in the year 1903, of the 15,671 death certificates received from the Board of Health in the Province, only 8,269 were signed by medical men, 6,906 by parish priests, 217 by other witnesses, while 279 were not signed at all. We ask what is the value of diagnosis made by those those who have not full knowledge and, it may be added, we think with justice, that if under these conditions the diagnoses are given of tuberculosis, such diagnoses may with very fair security be accepted to recognize the tendency there is on the part of families and their friends to put down the cause of death as other than this unpopular disease. Here we may note the present state of affairs in reference to the law regarding the notification of open tuberculosis. Although this law exists upon the statute books, we find that this is not generally known to the practitioners of the province or to the public, or, if known to the former, through a wish to please the patient and his family, medical men are apt to describe the condition by some other less compromising name. There is considerable evidence that among children the term "broncho-pneumonia" given in the death certificates, not infrequently conceals acute tuberculosis, following upon measles or whooping-cough, or the description given is that following upon or due to the sequelae of either of these diseases. The diagnosis of meningitis often covers tuberculosis; congenital debility or athrepsia covers one of the forms of infantile tuberculosis; "peritonitis" pure and simple is put down for abdominal tuberculosis. The abundant studies upon infantile tuberculosis indicate that this is more frequent than used to be thought, thus professor Landouzy, of Paris, goes so far as to state that one third of the deaths of children under two years exists from tuberculosis, but according to the statistics of the leading children's hospitals, (The Great Ormond Street Children's Hospital) in London, one-third of the deaths of children under ten years of age is due to one or other form of tuberculosis. The majority of the deaths from tuberculous meningitis occur about the age of five, and such meningitis is almost always secondary to tuberculosis in some other region already existing.

Among adults, to calm the fear of patients, or their friends, or to hide the true nature of the disease from the public, neglected cold, catarrh, pleurisy, pleural effusion, inflammation of the lungs and chronic bronchitis are substituted for pulmonary tuberculosis, and the words "chronic diarrhoea" or "chronic catarrh of the intestines", will take the place of intestinal tuberculosis. In old age, when tuberculosis is more frequent than is generally supposed, the words "chronic catarrh" or "chronic bronchitis" are used. Certificates of death require that there should be indicated the primary cause and the immediate cause of death. Too often the last only is given, when for

the statistician it is necessary to possess the knowledge that lies in both. For example, tuberculous patients may die of a complication, as hemorrhage, acute congestion or acute pneumonia: statistics become falsified if the latter alone be given, or again in a case of death from tuberculous peritonitis or tubercular meningitis if the word "peritonitis or meningitis" be given.

These few examples are sufficient to give an idea of the numerous cases of tuberculosis which escape notice under false or inadequate designations in our official statistics. But even were those statistics exact, they would not even then afford us a true knowledge of the extent of the disease. They tell us only of the number of those who die, not the number of those who are near death and are at the time suffering from the disease. They take no account of that large class of those who suffer from the disease for a longer or shorter period and finish by recovering, but at the same time remain in a weakened state. It may safely be stated that for a thousand tuberculous patients who die, another thousand are about to die, and another thousand are affected already more or less seriously. And yet, larger than ever, there are those who, have undergone a striking affection at some previous period, still retain in their tissue living germs of the disease, capable of, as it were, flaring up, should the vitality of the individual become seriously lowered. The true extent of the ravages of tuberculosis is well known to medical men, but it can scarcely be conceived by the public. How many of those who treat themselves, who are in weak health, chlorotic, dyspeptic or neurasthenic, are in reality infected with tuberculosis?

Proof has been afforded by exact clinical methods and by post mortem records that about 40 to 50% of human beings are infected, and as many as from 90 to 95% have at one or other period of their life been thus infected. The popular eye only sees the deaths and the advanced cases, but the medical eye sees more. Naeguli in Zurich, Switzerland, as the result of a careful microscopic study for the signs of tuberculosis in every body coming to post mortem examination, found that from a series of 500 autopsies from all sorts of deaths, indications of tuberculosis were detected in 96 out of every 100. His figures caused a sensation when he communicated them to a Scientific Congress, and led to similar studies in other scientific centres. Those studies have been confirmed, at least for dense urban populations; thus, for instance, out of 1000 autopsies performed at the Royal Victoria Hospital, Montreal, by Doctors Adami and McRae, tuberculosis was found in 417, a proportion of 41.7% divided as follows: general 43, pulmonary 85, Tuberculosis of bones 13, Tuberculosis in the genito-urinary system 10; it was cured in 151 cases, latent in 93, active in 22. It should be observed that if those figures are not as high as those of Dr. Naeguli, it is due to the fact that the examinations were made with the naked eye, without the aid of the microscope.

They have further been confirmed by the employment of the tuberculin test. Franz, a German army surgeon, employing tuberculin in small doses upon the soldiers of a squadron, obtained a positive reaction of 68%, although the dose of tuberculin was very small.

These facts demonstrate that tuberculosis is very much more widespread than is generally imagined, and from another point of view, encouraging, inasmuch they show in the majority of people that the forces of the organism are capable of resisting the disease.

Nevertheless, the following figures are undoubtedly impressive as affording some idea of the ravages of tuberculosis. The United States lose 160,000 citizens from this disease each year, France 100,000, Germany 90,000, the British Isles 60,000. This is the actual loss of life from the disease. How many more are there afflicted by it? Professor Osler estimated that in the United States there are 250,000 tuberculous individuals, of whom one quarter are incapacitated for work.

According to the statistics of the Imperial German Assurance Office, of each 1,000 German working men between the ages of 20 twenty-four, who are laid off work, 548 are incapacitated in consequence of tuberculosis, and between the ages of twenty-five and twenty-nine, 521 out of the thousand similarly owe their incapacity to this cause. It is difficult for the public to grasp these facts. Why they are not generally realized is that the victims are scattered in various homes, and a large proportion do not ask government aid or make their appearance in the hospital wards and "out of sight is out of mind." As for example, an army of 31,190 men distributed over the Province would scarcely be noticed, but where it is collected at one spot would undoubtedly attract attention and inspire fear. Indeed, the object of statistics is to group together individuals of certain groups, and by exhibiting totals, to attract attention.

To get an accurate idea of the ravages of tuberculosis not only the deaths recorded by statistics should be taken into account, but also the number of those who are dying, whose health is weakened, who are unable to work, in a word the resulting family and social degeneration.

Lastly, in striving thus to show the effects of tuberculosis the effect on the individual alone is not to be considered. There must be taken into account also the influence of the disease on the welfare of the family and the social effects.

Economic Effects of Tuberculosis.

The above vital statistics tell us the final results of the number of deaths from the disease. But to round off our knowledge and get a more exact idea of its effects, it is necessary to attempt an estimate, (1) of the economic loss represented by these losses of human life, by the loss of wage-earning power; (2) the cost of attendance and care of those suffering from the disease, while, (3) some estimate should be made of what would be saved to the nation by the treatment of curable cases.

(1) The individual human life has certainly an economic value, since human work is the sole source of capital and it is collective work that makes the wealth of the nation. But certainly, also, individual human life has not the same value in all parts of the world and at all periods. It varies according to certain conditions. And when, as the result of a strike affecting a group

of workmen, work and production are arrested for a longer or shorter period. at the end of the strike it is possible to estimate that the stoppage of work has cost the nation so much money: in exactly the same way death is the completer arrest of work, diseased the suspension of the same, and both entail economic losses.

As to the extent of these losses to the nation, we can not do better than employ the calculations made by Professor Fischer for the United States, where the economic conditioins resemble our own. We here give his estimate of the monetary loss, due to tuberculosis in a single year in one city, Chicago.

Estimate of the Money Value of the Lives lost by Tuberculosis, in 1908, in Chicago.

Age at Death.	Number of Deaths.	Value of life at certain ages.	Corresponding amount in money.
0 — 5	251	$1,500	$ 376,500
5 — 10	54	2,300	124,200
12 — 20	336	2,750	924,000
20 — 30	1,003	6,250	6,275,000
30 — 40	913	6,500	5,934,500
40 — 50	733	5,250	3,848,250
50 — 60	394	4,500	1,773,000
60 — 70	185	1,500	277,000
70 — 80	45	750	36,800
80 — 90	10	300	3,000
			$19,572,250

Here Professor Fischer takes as a basis this calculation, (1) that the sufferer has been incapacitated for work twelve months, and secondly, the mean wages between 20 and 60 years.

Estimate of Wages Lost.

Age at death.	Number of deaths.	Yearly wages.	Amount lost.
20 — 30	1,003	450	$451,350
30 — 40	913	500	456,500
40 — 50	733	450	329,850
50 — 60	394	250	98,500
			$1,336,200

As a basis for this calculation, Professor Fisher holds that the cost of maintenance of each individual has been as least fifty cents per diem, and this for one year amounts to $180.00, say for one year 3,928 x 180 — $707,040.00.

Loss of wages among those suffering from the disease and not yet deceased. The estimate of the number of those incapacitated for work is

 Corresponding amount in money: $36,000, and .

taken as 10,000; working capacity for these is regarded as reduced by one-third, which cannot be regarded as an extreme reduction. In making similar estimates the following figures are obtained.

Age in the case of living:	Number of living cases:	Loss of wages in dollars:	Money value of wages lost:
20 — 30	2,500	$150.	$375,000
30 — 40	2,300	165.	379,500
40 — 50	1,870	150.	280,500
50 — 60	1,000	85.	85,000
			$1,120,000

Cost of the disease for these 10,000 cases.

Calculated at .25 cents per diem, or at $90, per year per person: $900,000.

Grand total. The cost of tuberculosis for the city of Chicago in a single year, 1908, $28,635.

These calculations made in the city of Chicago will serve as a basis for estimating the losses caused by tuberculosis in the province of Quebec, it being accepted that the figures for the population and for mortality are nearly the same in the two cases.

	Population	Tuberculosis Mortality:
Chicago	1,600,000	3,927
Province of Quebec (Census 1901)	1,648,898	3,373

This comparison, as will be seen, is slightly to our advantage, but it deserves remark, that in a great American city, the conditions of life are very different; there is a greater density of population and more intense industrial work, and all these favor tuberculosis to a greater extent than do the conditions in our province, where the population is spread over a wide area, and work divided between commerce and agriculture, so that the above figures may well be applied to give us an idea of what tuberculosis is costing our province year after year. Other figures may be given which corroborate the above and show the enormous importance of tuberculosis from an economic aspect. Thus Dr. H. W. Thomas of Chicago estimates that tuberculosis costs the whole State of Illinois $36,551,000.00 a year or: through loss of work $30,000,000, economic loss by the death of those dying before the age of productive work $5,139,000, the cost of rearing those dying from tuberculosis under the age of twenty, $1,187,800; cost of the disease among consumptives cared for at the charge of the State $225,000. Professor Fischer calculates that tuberculosis costs the United States $330,000,000 per annum; it costs France a milliard francs, Prussia 86,000,000 marks, England and Wales 10,500,000 pounds, that is to say one-eleventh of the total sum expended for the relief of pauperism.

The treatment of consumptives in the work-house infirmaries alone cost 331,000 pounds; that is to say $1,613,970. Thus apart from the cost of tuberculosis to individuals and their families, by the loss of wages, sick expenses and others, the enormous burdens it imposes on society, through the relief to patients impoverished by the disease, would be taken into account.

(2) What would it cost the community to undertake the cure of the disease among those affected thereby?

Let us suppose that there exist in the province 10,000 cases which could be cured were they to spend six months at a sanatorium. It is no excessive estimate to take for granted that half of these would need to be cared for. Experience tells us that there should be established 2,500 beds so that each individual might spend the necessary six months in the sanatorium. But now the average cost of establishing a sanatorium is in the neighborhood of $1,000 per bed, (we can calculate now on $600 per bed) wherefore, to afford adequate accomodation there would have to be expended $2,500,000. Attending each case costs on the average one dollar a day. The whole 5,000 therefore, each treated for six months, costs all together $912,5000. It might be urged that the sanatorium would be in use for two decades, by which time the disease would be practically extinct, while the building would be employed for other purposes.

(3) What advantages does our province gain from treatment of curable cases of the disease?

Dr. Knopf of New York, a well-known specialist, has made a calculation in answer to this question. Of 10,000 patients presenting tuberculosis, which is clinically recognizable, sanatorium statistics show that 7,500 or 75% can be cured. Putting the cost of sanatorium treatment at a dollar a head per day, and taking the excessive view that the treatment should be conducted one year, the cost of these 7,500 cures would be $2,737,500. Or, if we regard a six months' treatment as adequate (and this is more in keeping with general experience) the cost would be half this, namely $1,368,750. Left to themselves, and not treated as indicated by the statistics already given, these 7,500 sufferers would cost our community double the first amount, $5,575,000, without taking into account $912,500 which would be the cost to the community of the other 2,500 sufferers, making up the total 10,000 cases. In other words, the care of 10,000 poor tuberculosis patients, undertaken at the right time, in good surroundings, and by proper methods would thus be regarded as costing **at a maximum** $3,650,000. Absence of proper treatment as regards 7,500 curable cases costs $5,575,000.00.

Thus we reach the following conclusions, that, by preventing the death of 7,500 workers, the nation makes an economy or profit of, at least, $1,925,000, and this figure does not take into account the subsequent wage-earning and value to the community of those whose lives are saved, and, naturally, does not include the arrest of physical and moral suffering and of misery in a vast number of families. Now, if an active campaign be undertaken by the state, these figures must necessarily undergo a diminution in each subsequent year and this because in the first place, isolation and hospital treatment must

materially reduce the chances of other individuals becoming infected by the sufferers, and, in the second, patients so treated in a sanatorium become the best educators of their neighbors in the community in general.

There is another most important matter which, in our preoccupation over the monetary aspects of the problem, we are apt to neglect, that is, the familial and social degeneration that is one of the intimate consequences of this disease. In fact the tuberculous, as a body, may, from a physical point of view, be regarded as degenerates: they are, unfortunately, apt to be prolific, producing descendants who also are of feeble constitution, and, as a body, are more liable to tuberculosis than are the descendants of non-tuberculous individuals.

Thus, from every point of view, those affected with tuberculosis become a painfully heavy cost to society, whether, as is generally believed, their descendants are, from their constitutional predisposition, specially liable to contract the disease or whether those descendants, are liable to acquire the disease in their early years, by direct contagion from these patients.

Undoubtedly, we see that there is a liability for these descendants to impose a still heavier charge upon the community unless proper measures be taken to destroy this vicious circle and its tendency to become progressively larger and larger. The cost of negligence in these matters is to ensure an increasing burden to the nation and racial degeneration. Nor is this question of racial degeneration merely an abstract idea. It is a very real matter. We need but recall the consternation produced in Great Britain at the time of the Transvaal War, when the existence of this progressive degeneration among the artisan class was demonstrated by the appalling number of "voluntary" recruits, who had to be rejected in consequence of their failure to attain to the not excessive standard that had been established a generation previously, of height, chest measurement, etc. And in Great Britain these revelations have produced a very active movement for the establishment of practical means of arresting physical degeneration more particularly in the direction of approved civic hygiene, of ventilation at home and at school, provision for parks, playgrounds and abundant fresh air for the development of the individual, etc. The same has been ascertained in France, where people are appalled by the ever increasing number of conscripts that have to be rejected owing to physical degeneration. And it is not only from a military point of view that this degeneration is a serious matter: the quantity and the quality of the work accomplished by the individual are in intimate relationship to his general health and activity.

Wherefore, whether this question is to be considered from a humanitarian, an economic, or from a national point of view, the campaign against tuberculosis, based upon the scientific data and conducted with determination and perseverance, must be undertaken by the people of our province.

CHAPTER II.

The Causes of Tuberculosis

A.—GENERAL CAUSES OF TUBERCULOSIS.

A plan of campaign against tuberculosis should be based upon a knowledge of the nature of the disease and of its predisposing causes. And here in the community in general, and as shown by the answers received from the physicians of the Province, two opposing opinions are current, one section regarding **infection** as all-important, the other seeing in **heredity** the preponderating factor. Now as prevention must be based upon a knowledge of the true cause, it is of first importance that light be thrown upon this matter.

What is the Nature of Tuberculosis?

It is familiar knowledge to medical men that the infectious nature of tuberculosis was first clearly proved by Willemin in 1865 and that the causal agent, the tubercle bacillus, was discovered by Robert Koch in 1882. Thus all physicians know that tuberculosis is an infection caused by a particular or specific micro-organism. Where the division of opinion begins is as to what is the chief factor in the enormous spread of the disease. While the majority of our physicians reply that they regard infection as the main factor there are those who report that they have recognized no cases of direct infection, others who state definitely that heredity plays the leading role.

As physicians must of necessity be the foremost fighters in this campaign it is proper that they should rally beneath a common flag. We would therefore endeavour to show what this is — to demonstrate the facts which in the light of our present knowledge demand universal acceptance.

PROOFS OF INFECTION

1. **Clinical proofs.** — It is an astonishing fact in the history of science that a truth twenty centuries old should become obscure, be lost, and be found again. Such has been the fate of the clinical truth of the infectiousness of tuberculosis. Even in the Hippocratic era of medicine, one finds the most categorical affirmation of such infectiousness in the mouth of Galen who said it was dangerous to spend a whole day in the company of a tuberculous person. Avicenne, speaking of the diseases transmissible from man to man, gives phthisis as an example. Valsalva, and later Morgagni performed no autopsies on the corpses of persons who had died of phthisis, through fear of infection.

In 1746, under the reign of Ferdinand VI, in Spain, the idea of the contagiousness of tuberculosis was so prevalent that a royal edict enacted the

following very strict laws: "As experience has shown how very dangerous is the use of linen, furniture and other effects which have belonged to persons who have been afflicted by or have died of hectic fever, phthisis or other contagious disease, we command all physicians to make known the names of such persons who have been ill or who have died of phthisis, so that the alcalde may have their furniture, linen and other effects burned; so the alcalde may order the premises where the patient died to be replastered and whitewashed, the floor scraped, and the alcove where the bed was changed. Moreover a record shall be kept of the places whence clothes offered for sale in second-hand shops have come, as well as of the names of the wearers and sellers of such clothes. The alcalde shall certify that such clothes are free from contagion. Such certificate shall be the only authorization given to vendors of second-hand clothing. Every physician who shall not make known a case of consumption shall be condemned by the alcalde of his ward to a fine of 200 ducats and the suspension from the practice of his profession for one year for the first offence and to a fine of 400 ducats and to exile for four years for a repetition of the offence. All other persons, sick nurses, attendants and servants of the sick who do not declare the case, shall be condemned to imprisonment for thirty days for the first offence and four years in the galleys for the second offence. The religious, military and civil authorities shall have the linen used by consumptives burned."

In order to enact such precise and strict laws, people must truly have been certain of the contagiousness of tuberculosis. It is curious to note that we, who are certain to a far greater extent, since our certainty is based on experimental proofs which the people of those days did not possess, do not do one fourth of what they did. And such belief in the infectiousness of phthisis was not confined to Spain. In 1754 the magistrates of Nancy ordered the furniture and linen that had belonged to consumptives to be burned.

In 1754, the College of Physicians of Florence pronounced themselves in favour of the contagiousness of phthisis. In 1782, a royal edict in Naples, ordered the destruction of articles contaminated by consumptives and the disinfection of their dwellings by washing them with sea-water and balsamic fumigation. Belief in the contagiousness of tuberculosis among the physicians and among the people is therefore as old as the history of medicine itself. That belief suffered an eclipse during the first two thirds of the 19th. century owing to the influence of the anatomic theory of tuberculosis maintained by Laennec and his disciples. The idea of constitutional diathesis predominated during that period. To re-unite the chain of the twenty-century-old tradition, the memorable discoveries of Villemin in France and of Koch in Germany were needed.

2. **Experimental Proofs.** — The experimental period begins with Villemin. He took tuberculous matter, both from men and cows, and infallibly obtained the tuberculization of the animals inoculated and never with other pathological products than those of tuberculosis. In his communication to the Academy

on the 5th December 1865, he concludes by saying "Tuberculosis is a specific affection; the cause resides in an inoculable agent" and later in 1869 he said: "The inoculation of the tubercle does not act by the palpable and visible matter entering the pathological product, but by the virtue of a more subtle agent that is contained in it and which escapes our senses." The finding of that subtle agent was reserved for another, but the discovery due to Villemin's genius already contained, as Professor Landouzy says, the clinical and experimental demonstration of the **virulence** and **transmissibility** and the **infectiousness** of tuberculosis as well as the notion of the **determination** of the disease and the principle of its **avoidability.** The whole of scientific prophylaxis lies in this. But even in his own country, the doctrine of special diathesis was so strongly established, that Villemin's positive facts were received with doubt by a large number of physicians. This was still more evident in Great Britain and Germany where Villemin's capacity as an investigator was less known. To remove all doubts there was needed the discovery of Robert Koch. Improving upon the methods of Pasteur, the founder of bacteriological science, Koch discovered, stained, cultivated and inoculated with success into various animals the bacillus which bears his name, by his inoculations reproducing the typical disease in these animals. Since 1882 that bacillus has been scrupulously studied in all its features, its biology, its composition, its resistance to various agents, its mode of growth in the body, its products of growth, the nature of the lesions it causes in the body. All these have been studied by an army of workers throughout the civilized world. There is complete unanimity of opinion regarding all the important points concerning the properties of the bacillus and its action upon the body, says Brouardet.

ESSENTIAL CAUSE OF TUBERCULOSIS

Infection, that is to say, the invasion of the organism by Kock's bacillus **is the essential, primordial, necessary cause, the causa causans** of tuberculosis. Nevertheless that bacillus follows the general rule and, to live and develop, it requires a favorable medium or solid; microbiology teaches us, in fact, that infinitesimal changes in culture mediums suffice to encourage or to hamper the life of microbes.

The celebrated clinical physician Trousseau divined this law when he wrote: "Sow seed in mould and you will have a fine crop; sow on stone and you will get nothing. So long as we are rock, we resist; if we weaken we become mould and we are ill." This law, as so expressed, is too absolute, for, in truth there are exceptions. Thus there are robust people and animals which are nevertheless overcome by tuberculous infection in cases of massive, intense or prolonged exposure thereto.

Once planted in an organism whose natural defences are not sufficient to vanquish the bacillus, the latter multiplies in an astonishing manner. Patient seekers have found millions of such bacilli in a single sputum of a phthisical patient. Thus, whenever such a person expectorates on the ground, he sows

the germ of the disease around him. The greater the number of bacilli the more they are in a state of high virulence, the greater are the chances that persons living with the patient will some day be infected. In this way infection accomplishes its work, in families, workshops, factories, offices, in a word, wherever human beings are gathered together. If an individual becomes tuberculous it is because he has lived with persons affected by open tuberculosis. Life in common, and in close intimacy multiplies the chance of infection.

Infection, that is to say, the transmission of the germ of the disease, is the predominant factor in the spread of tuberculosis. The proof of this is derived:

(1) From observation and experimentation among animals; (2) From the observation of positive facts among human beings.

Observations upon Animals

(a) Observation of what happens to animals, among which it is easy to vary and to check experiments, clearly shows us that in herds of cows—which in reality constitute families, infection alone and not heredity, explains the spread of bovine tuberculosis. In a communication to theWashington Congress 1908 Bang, of Copenhagen, the greatest authority on the subject, said: "In so far as the milk cow is concerned, it can be clearly proved that the disease is introduced and spread by infection and **by infection only.** The fact of living for long periods side by side with cases of open tuberculosis that are spreading numerous bacilli around them produces the disease in healthy animals. It is thought that one can easily obtain a sound herd from calves born of cows showing a reaction to the Tuberculin Test, when the herd is kept away from the infected stable and protected from the outset from infection by milk." And he adds: "one is justified in applying such results to human beings. Remove the child from the tuberculous and infected mother, place it in hygienic conditions; let it not be infected by milk and it will remain healthy." We have already seen that, in fact, the same results have been obtained in the children's asylums of Prague, Nuremburg and Munich.

(b) We will see, in connection with heredity, that thousands of autopsies prove that congenital tuberculosis is an exceedingly rare exception among cattle. Thus, tuberculosis which is greatly spread among the bovidae is explained solely by infection, since its source is not found in heredity.

(c) It has also been clearly observed that, in herds long free from tuberculosis, the disease has shown itself only after the arrival of a sick animal.

Experimentation upon Animals

(a) Experimentation proves that animals, such as dogs, that are healthy and even refractory, catch tuberculosis either by licking up the sputa of the consumptives or by eating the remains of their food.

(b) Villemin tuberculized guinea-pigs merely by letting them trample on wadding previously sprinkled with the sputa of phthisical patients.

(c) The experiments of Cornet, of Berlin, more closely approach the conditions of ordinary life in the dwelling of the consumptive who is not careful, who expectorates on the floor, and they show to an admirable degree the dangers of dry sweeping. Cornet took a room with about ninety-nine cubic yards of air space; he scattered sputum from tuberculous patients on the floor and allowed it to dry, mixed with a little dust; he put 48 guinea-pigs in the room at various heights; then he swept the floor with a broom thus raising the dust. The result was that 46 out of 48 guinea-pigs became infected.

(d) Cornet made another experiment to prove the preponderant part played by dust as a vehicle for the tuberculous germ. By collecting dust in places inhabited by phthisical patients and in others not inhabited by them and by inoculating guinea-pigs with it, he proved that the dust collected in the dwellings of consumptives communicated tuberculosis, while that collected where no consumptives had lived did not communicate the disease to the animals experimented upon.

(e) Swenson, of Stockholm, put fifteen calves in a stable containing tuberculous cows, but several metres away from them in order to avoid all direct contact and he found that nearly all of them became tuberculized.

(f) The experiments made by Mott, Lenoir & Camus could not be more simple nor more conclusive. They put twelve guinea-pigs in boxes separated with gratings; two on the floor away from the beds of the tuberculous patients and one near the ceiling of the room; at the end of a few weeks, four guinea-pigs out of twelve had become tuberculous, having been infected merely by the dust.

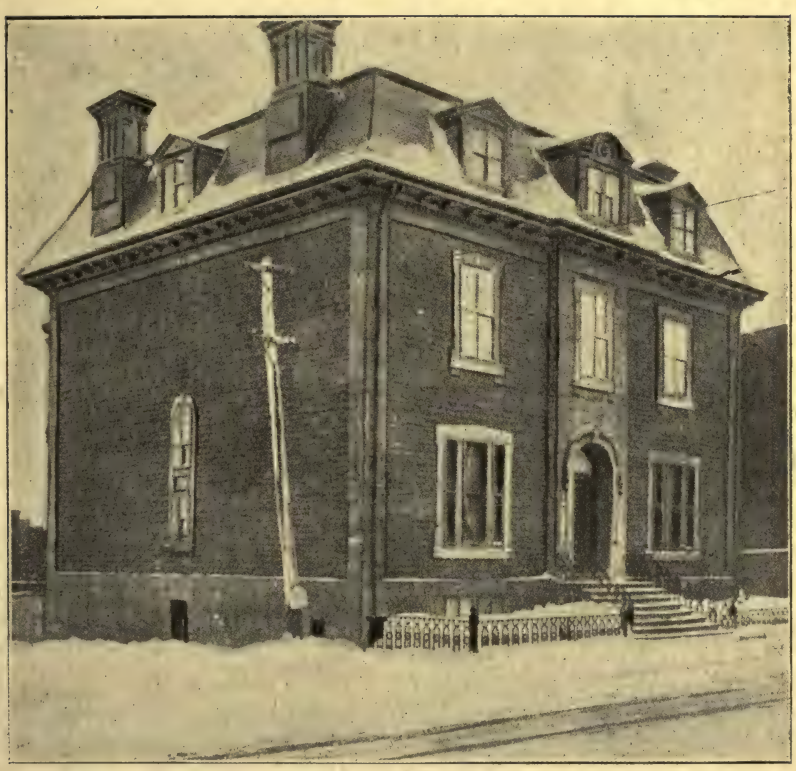
Observations upon Human Beings

(a) As among animals, congenital tuberculosis is an exceedingly rare exception. Infection alone, therefore, can explain the innumerable cases of tuberculosis among human beings.

(b) Statistics prove that children begin to be tuberculized only after birth and that their death-rate is in exact proportion to the increase in chances of infection. This truth was brought to light as far back as 1884 at the Congress of Copenhagen by Heller, who, out of 1,300 autopsies on children, obtained the following figures: In the foetus: no tuberculosis; in infants under seven weeks: no tuberculosis; in a child of eight weeks the first case of tuberculosis; from 3 to 5 months 10 (4%) from 6 to 12 months 17 (3%) from 1 to 2 years (26%) from two to five years 45%.

These statistics are corroborated by more recent figures from Comby in France as follows: Out of 1,447 autopsies on children Mr. Comby found 536 cases of tuberculosis divided as follows:

Under 3 months..	316	autopsies	4	tuberculous,	say	1.2	p.c.
Between 3 & 6 months..	217	"	39	"	"	18.	p.c.
Between 6 & 12 months..	25	"	69	"	"	27.	p.c.
Between 1 & 2 years..	327	"	141	"	"	43.	p.c.
Over 2 years..	333	"	283	"	"	67.	p.c.



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(c) Infection alone can explain the cases of tuberculosis in children whose near and remote relatives have not been affected by the disease.

(d) Infection alone can explain the following fact which is not unique: A mother,who had enjoyed good health until the age of 54 years,was suddenly attacked by laryngeal phthsis which caused her death after a year's ilness; six months afterwards, her husband, in whose family there had never been any tuberculosis, died of phthisis; then seven children died of tuberculosis one after the other; the eighth, a girl, who also became tuberculous, was cured by a long open air treatment.

(e) Deaths, at short intervals, from tuberculosis among small gatherings of employees in offices, workshops, etc., cannot be explained by heredity, but only by contagion. Now, such facts are numerous. The following examples are quite authentic and typical: Dr. Marfan saw, in the space of 12 years 14 employees, working in the same office, succumb to pulmonary tuberculosis (Epidemic of Pulmonary Tuberculosis. Semaine Médicale, 1889). Dr. Landouzy saw, in an office in Paris, 13 out of 22 employees succumb to pulmonary phthisis in the short space of five years, after the coming of two consumptives. The employees of the municipality of Karkov were dying of phthisis. This attracted attention and investigation was held. It was discovered that through moistening his fingers with saliva, a tuberculous employee had contaminated all the pages of the documents he turned over. On those documents numerous bacilli were found, which, on being inoculated into guinea-pigs, proved very virulent. In the United States, Dr. Knopf has recorded an absolutely similar case: twenty employees of the Health Office of Lansing, Michigan, caught tuberculosis from documents infected by the bacilliferous saliva of one of their colleagues.

(f) Tuberculosis which breaks out among the successive tenants of a room previously occupied by a phthisical patient is a very striking proof of indirect contagion. There are well authenticated examples of this. Here is one which is all the more conclusive that it dates from before the discovery of Koch's bacillus. In 1859, Delamarre placed before the Académie des Sciences, in Paris, the case of a room which had been occupied by a sufferer from phthisis, who in fact died there. Three subsequent and successive tenants of this room, not related and previously in good health, died successively from the same disease. More recently during the last twenty years Flick of Philadelphia, plotting out the death certificates of that city for a series of years, has shown that in particular streets, there are particular houses in which despite change of tenants, there have during these years been deaths from tuberculosis out of all proportion to those occuring in immediately adjoined houses. Juillerat, Director of the Casier Sanitaire de Paris, has independently made out the existence of the "maisons maudites" or accursed houses, hot-beds of the disease in which nearly all who enter as tenants succumb to tuberculosis. In New York the same has been observed and these tuberculous houses, existing especially in the crowded tenement districts are known as "lung blocks."

(g) Tuberculosis showing itself, in adult age, among men chosen chiefly for their stature, their vigor, their robustness, such as soldiers, policemen and sailors, is explicable solely by contagion. In 1859, Dr. Tholozan, observing the disease among the strong men of the army, wrote; "if the opinion I express is confirmed (and it has been absolutely) it will be necessary in future, to consider the phthisis of armies rather as a **specific infectious disease** than as a diathetic organic affection". (Gazette de Médécine 1859). Recently, Dr. Letulle has pointed out the frequency of tuberculosis in the French Army, Mr. Vincent in the Navy and Mr. Landouzy in the Police.

All these positive facts show in an irrefutable manner that infection is the preponderant factor in the spread of tuberculosis. Contagion in the family, contagion in all gatherings of employees working together, infection in lodgings, such are the chief soucres of tuberculosis.

HEREDITY

As there can be no tuberculosis without the presence of specific bacillus tuberculous heredity can only mean that the tubercle bacillus is conveyed to the child from the parents. But admitting this, all the facts in our possession show that, both in the domestic animals and in human beings, congenital tuberculosis is singularly rare, so rare that it cannot explain the vast mass of cases. Further it cannot explain why tuberculosis is most common, not in early childhood, but in years remote from childhood, for the death-rate from tuberculosis is the highest between the ages of twenty and forty-five years.

Here is a proof that congenital tuberculosis is a rare exception. Among 160,000 calves examined in the Munich abattoir, pulmonary tuberculosis was found.

In 1878	2	cases
In 1879	1	"
In 1880	0	"
In 1881	0	"
In 1882	2	"
5 years	5	"

Similar results were obtained at the Augsburg abattoir where only 5 cases were found from 1878 to 1881 — and even in these five cases the calves were not new-born but some weeks old, and might therefore have become infected from their mother's milk. As a rule tuberculosis shows itself in cattle at and after the age of three years. These figures are in striking contrast to the frequency of tuberculosis in adult German cattle: In many parts of South Germany, abattoir statistics show that 50% and more of these are infected.

Among children congenital tuberculosis is like-wise a rare exception. In fact the well authenticated list of cases of congenital tuberculosis is limited to three: one of Charrin in 1873; one of Berti in 1882; one of Merkel in 1885.

And yet the anatomo-pathologists have made strenuous searches for it. Virchow, the celebrated German pathologist, declared, in 1884, at the Copenhagen Congress of Medical Sciences, that he had never found a single case of congenital tuberculosis. The same affirmation was made by Heller, of Kiel, at the same Congress.

As among animals, children begin to manifest tuberculosis only after birth and the death-rate from tuberculosis among them is in exact proportion to the increase of chances of infection and contagion. In fact, it is demonstrated, by the agreement of all autopsies, that the proportion of tuberculous children increases with age. We have already shown that the autopsies of Heller and of Comby are in accord, although at an interval of many years. We have also seen that children born of tuberculous parents and calves born of tuberculous cows do not themselves become tuberculous if removed in time from infection. These observations, both among animals and among human beings, prove that tuberculosis is not transmitted fully developed and that it begins rather after birth and increases proportionately with the chances of infection through milk or family contagion.

But in order to prove the transmission of tubercle bacillus, partisans of heredity allege the positive experience of Landouzy and Martin, who succeeded in making the bacillus pass through the placenta. Such may have happened but it is an artificial laboratory experiment which has not been confirmed. Mr. Sanchez Toledo resumed in 1889, the experiments made with irreproachable technique in Professor Strauss's laboratory and obtained only negative results and yet the experiments dealt with 65 foetuses from 17 inoculated females.

Partisans of "heredity" also allege the example of syphilis which is transmitted by heredity and may make its appearance only tardily. This is true for syphilis, but it is not proved that it so is for tuberculosis. Moreover, the argument may be turned against them. Cases of tardy hereditary syphilis are also an exception since it needed that sagacity of an observer such as Professor Fournier to discover and reveal them to us, and they can not any more than congenital tuberculosis can, explain the enormous spread of the disease.

Thus, partisans of heredity being unable to derive solid arguments from anatomo-pathology and experimentation, turn to clinical observation and say: there is undeniable hereditary predisposition, a tuberculizable ground. Their argument is based on the following clinical facts. 1. Tuberculosis finds more victims among children of tuberculous parents; 2. there is a tuberculous born type with particular stigmata. These two arguments are weak. In the first place — as regards the finding of more victims of tuberculosis in tuberculous families — it is much more easily explained by family contagion, but it very often happens that children die one after the other without the parents being tuberculous. If, to overcome this difficulty, they consider as a hereditary case every tuberculous person whose remote or collateral ascendants have been tuberculous, the argument would not hold, because it might apply to all

diseases which are frequent in families. Thus, there are but few families in which there have been no cases of typhoid fever, measles, scarlet fever, smallpox, etc. And yet it cannot be said that these are hereditary diseases because they occur among parents and among children. Tuberculosis is a disease so widespread that it is found in nearly all families. But this does not imply that it is hereditary.

As to the other argument, the tuberculous born type, that is, especially predisposed tuberculosis, it does really exist. A Venetian type has been described with white flesh, lymphatic and with fair or red hair, and narrow flattened thorax, sickly aspect, etc. Such a type certainly does exist, but does it alone represent the majority of tuberculous cases? Evidently not. Then if heredity explains the cases of this type, it does not explain the majority of cases. According to the statistics of the Phipps Institute, in Philadelphia, this blonde-red type represents the minority, although the patients of the Institute are recruited chiefly from among Celts (Irish) and Teutons (Germans). Another argument against this Venetian type is the established fact that negroes furnish four times more tuberculous cases than the whites. And among the latter the dark featured furnish the more. Hereditary stigmata are far from being found among the tuberculous. On the contrary, a great many tuberculous persons have all the attributes and all the appearance of health. The influence of heredity cannot be alleged in the case of the latter.

In fine.....what is hereditary is the **tuberculizable ground,** but granting this, **this is not of essentially tuberculous origin.** What constitutes the tuberculizable ground is a **general and local impairment** of the tissues accompanied by **deficient vitality,** whence there results a **diminished resistance** to microbic (bacterial) aggression. But such impairment is not exclusively brought about by parental tuberculosis. We recognize similar dystrophy or impaired development in those of syphilitic and alcoholic parentage, nor do the observations in our possession demonstrate with any precision that the tuberculous, syphilitic and alcoholic dystrophies are distinct and specific types or that the child of tuberculous parentage is more predisposed to tuberculosis than is the child of the syphilitic or alcoholic. This may be so, but it has not been proved. The child of the tuberculous parents may be degenerate from the physical standpoint, and with this there is likely to be an accompanying want of development of the protective powers of his tissues. It must be realized that a reduction of the protective powers of the tissues may be brought about in other ways: overwork, insufficient or improper food, the lack of fresh air and sunshine. The work of recent investigators, more particularly in France, has brought forward a body of evidence showing that the **demineralization of the tissues,** the deficiency in calcium salts, whether congenital or acquired from over-work and inadequate nutrition or pre-existing disease, constitutes a very important portion of the tuberculizable ground. Increase the calcium and allied mineral contents of the tissues and the resistant powers of the individual are thereby increased. It is found, further, that pure air and sunshine increase the phagocytic activity of the body cells. The

same conclusion was come to in the matter at the ninth conference of the **International Anti-Tuberculosis Association** held at Brussels in October 1890: "As regards heredity of tuberculizable ground, hereditary impairment of tissues, Mr. Landouzy considers that, in phthisis, it must be considered as frequent as the inheritance of the seed seems exceptional. Mr. Calmette does not think that the existence of a specific hereditary distrophy as regards tuberculosis infection can be scientifically admitted any more than the existence of congenital immunity from tuberculosis." Mr. Arloin came to the following conclusions: "It is difficult to prove experimentally a real predisposition either in-born or hereditary to tuberculosis; parents often transmit a certain functional debility which renders the subject accessible to the various causes of mortality or arrests development to a more or less greater degree." Dr. Heron, of London, says that this theory is based on arguments which do not sufficiently prove its accuracy for, as a matter of fact, the proofs available show chiefly that tuberculosis is spread solely by infection.

HOW THE MORBID GERM IS TRANSMITTED.

If, therefore, tuberculosis is an infection transmissible from man to man, it is now expedient to ascertain how the transmission of the morbid germ is effected.

It has been proved by Tyndall and others that air exhaled naturally contains no bacilli. It is otherwise with air exhaled more or less forcibly in the act of coughing by consumptives. Flügge proved in 1898 that the act by consumptives of coughing projects into the air drops of expectoration microscopically fine containing bacilli. These float about in the air for a few minutes and then fall on the dust lying on furniture or on the floor. This was first confirmed by Lashtchenke and afterwards, in 1901, by Heymann. By putting phthisic patients at a distance of one metre from a mirror, if they cough in its direction, Koch's bacilli will be found in the very minute drops projected on the mirror. If phthisical patients are placed before a cage containing guinea-pigs, and they cough in their direction, some of the animals will invariably be tuberculized. In course of investigations carried out upon tuberculous cattle for the Dominion Government at Outremont, Province of Quebec, under Dr. Adami, in 1903, Dr. Higgins, now bacteriologist to the Veterinary department of the Dominion, demonstrated this in a very simple and ingenious way. In place of a mirror he took a sheet of plain glass, which he had ruled with a diamond into a series of divisions the size of an ordinary microscope slide. Placing such a sheet of glass for some hours in front of the cow suffering from pulmonary tuberculosis with cough and allowing the fine spray to dry on it and become fixed, he then by breaking it into its divisions became possessed of a series of slides, upon which he put stain and detected the tubercle bacilli **in situ.** By putting for an hour and one half a phthisical patient in a room in which plates of exposed culture media were scattered here and there, Heymann succeeded after inoculations with the substance contained in those culture boxes, in tuberculizing eleven out of thirty-six

animals, say 30.5%, when the patient took the precaution to put his handkerchief before his mouth when he coughed and twenty-four, say 70% when that precaution was not taken.

But infection by bacilliferous dust is certainly the most fruitful source of tuberculosis in families, in factories and in all gatherings.

The experiments of Tappeiner, Cornet, Neisser, in Germany, of Prof. Strauss, of Kaüss, Lenoir and Camus, in France and of Coats in England, are absolutely conclusive. To these experimental proofs may be added those from observations, which show that workers in dusty trades have an exceedingly high rate of mortality from tuberculosis.

If dust is not always infectious, it is always irritating and productive of traumatism, thereby preparing the respiratory organs for the penetration of the morbid germ.

Channels of Entry

The bacillus enters the organism either by the respiratory or by the digestive organs or, much more rarely, through some break in the skin.

Bacilliferous dust may be inhaled or swallowed; the great majority of anatomo-pathologists and a great many clinical physicians think the respiratory organ the principal and usual way of entrance. That the bacillus can be inhaled and reach the lungs by various lymphatic channels is most clearly proved by clinics and by experimentation.

G. Morgan, in 1899, found the tuberculous bacillus in 12 to 15% of children with adenoid tumours. Prof. Dieulafoy demonstrated that the tonsils which receive the first attack of bacilliferous dust or food, are a very frequet way of penetration as indicated by the enlargement of the lymphatic glands of the neck. The lymphatics of the tonsil convey the bacilli to the cervical lymphatics then to the tracheo-bronchial and mediastinal and finally to the lungs. This has been confirmed by a great many clinical physicians and pathologists among others by Latham, who, in 1900 found the central portion of the tonsils tuberculous in seven out of forty-five children between the ages of three months and thirteen years.

Experimentally, it has been proved by Lenker, that, by making animals inhale dust reddened with some coloring matter, the pulmonary substance will be found colored red when the autopsy is performed. Knouff experimenting on himself by inhaling ultramarine for ten minutes only, found that epithelial cells on being forcibly expectorated were tinted blue. The autopsy of rabbits subjected to a smoky atmosphere revealed the presence of the particles of coal in the lungs. The pulmonary anthracosis of miners is another irrefutable proof of the penetration of dust into the pulmonary alveoli.

But the bacilli can also penetrate by the digestive organs and reach the lungs by the lymphatics and by the blood vessels. Food is the vehicle by means of which the bacillus reaches the intestine and among the various kinds of food, milk is the most bacilliferous. Realizing the great disproportion between the frequency of tuberculosis in childhood (which is especially

subject to infection by milk) and in adult life (which is especially exposed to the action of dust), it is difficult to arrive at any other conclusion save that inhaled dust is the commonest source of tuberculous infection, food, infected milk, the less common source and that mainly in childhood. The tonsils and the throat are integral parts both of the respiratory and the digestive systems: their infection might be due either to inhalation or food and might be claimed by the extreme adherents of either view. Let us freely admit this. We can safely neglect the debate over individual cases. These broader considerations can only lead us to the conclusion that inhalation is the most frequent source of the disease. Therefore, from the point of view of prophylaxis, it is of primary importance to prevent infection through the respiratory tract, to wage war upon dust and those conditions which favour the presence of tubercle bacilli in dust, and next to wage war upon infected milk.

Infection by Milk and Meat

(a) **By Milk.** — The tuberculous bacilli contained in milk can not be dangerous to man unless bovine and human tuberculosis are of the same nature; unless the bacillus of the bovine type can transform itself in the human organism; unless, while not transforming itself, the bovine bacillus can produce the disease in man.

Koch, the discover of the bacillus of tuberculosis, said, in 1882: "Bovine tuberculosis is identical with human tuberculosis and is consequently transmissible to man" but, in 1901, in his communication to the International Tuberculosis Congress at London, he expresses the opinion that tuberculosis infection from bovine sources is very rare in man and he therefore did not believe it necessary to take any measures against that source of infection. Koch did not change his opinion regarding the unity of tuberculosis. But he merely discussed the importance to be given to that source of tuberculization in man. This assertion that the bovine source is negligible in practice gave rise to an animated discussion which led to the appointment of a Royal Commission in Great Britain to enquire into the effect of food derived from tuberculous animals. The conclusions of the commission were as follows: The conversion into the human type of bacillus of the bovine type is not proved. But, 1. the bovine type and the human type may produce tuberculosis in human beings; 2. the two forms of the disease have been identified in man; 3. the bovine type is found more frequently in children than in adults (alimentation by milk); 4. the bovine type retains its special characteristics even in the human being; 5. tuberculosis of bovine origin is much less frequent in man than tuberculosis of human origin. Conclusions 1, 2 and 3 are based on certainties Conclusions four and five are probable. Conclusion 3 is corroborated by what has been ascertained by the great English hygienist Thorne, — Thorne who shows that, while the general mortality from tuberculosis has decreased 45% since 1850, the mortality due to abdominal tuberculosis among children under 1 year, has, on the contrary, increased by 27% since the same date. The explanation is that the English have greatly improved the condition of adult

life by making dwellings, factories and communities healthier and have done nothing to protect childhood from infection by milk.

The Imperial German Commission came to the same conclusion as the British Royal Commission as to the danger of bovine tuberculosis to man. The last Tuberculosis Congress, held at Washington in 1908, where the question was earnestly discussed by the greatest authorities of Europe and America, expressed an opinion that a campaign should be carried on against bovine tuberculosis. This question of the danger of bovine tuberculosis is therefore solved in the affirmative.

Now is the danger of tuberculosis whose germ is conveyed by cow's milk, great or slight? To answer this question, it is necessary to have an idea of the number of tuberculous milk cows. Everybody knows since we have had the tuberculine test, that tuberculosis is very frequent in the bovidae. Sir T. H. Elliott, Secretary of the Board of Agriculture in England, stated before the Royal Commission on Tuberculosis in 1898, that at least 20% of the cows in England were tuberculous. Delepine estimated their number, in 1899, at 20% and 31% adding that, on certain farms, ¾ of the cows were affected by the disease. In 1901 MacFadyan asserted that 30% of the cows in the country are tuberculous. In America the figures are a little lower, but in some places the proportion has been found to be 25%.

In Canada the frequency is less. In the vast herds of the North West that live the year through in the open the disease is practically unknown. As Manitoba is coming more and more under cultivation our information is that the disease there is increasing. In Eastern Canada including this Province, veterinary authorities place its frequency as not exceeding 10%. It will be understood that in certain herds, notably of pedigree cattle, the figure rises to 20 or 30% or even higher.

But another question arises: is the milk of every tuberculous cow dangerous? or only that of the cows affected by tuberculous mammitis? The opinion of Nocard, a veterinary surgeon of Alfort, France, one of the greatest authorities on the subject, is as follows: "We have the right to conclude that if the milk produced by tuberculous cows with clinically sound udders, may sometimes contain tuberculous bacilli, it contains only a small number of them insufficient to make it really dangerous to the consumer. In reality it may be said that only cows attacked by tuberculous mammitis are really to be dreaded; all our efforts should be directed against them." Such also is the opinion of the British Royal Commission.

Now, what is the proportion of cows affected by tuberculosis mammitis and which are the most dangerous? According to Nocard, the proportion in France would be two per cent (2%) for clinically apparent cases. But he adds that it is advisable to increase this figure by one unit to include the cases which, during a certain period of time, do not yet manifest themselves by evident signs. Prof. E. MacFadyan, in England, also says that, from his experience, 2% per cent of the milch cows are affected by tuberculous mammitis. Prof. Delepine makes the figure 3%. According to Muller, the figure

was from 1.1 to 3.7% in Saxony from 1888 to 1897 and 1.6% among the tuberculous cows of the whole of Germany. In Denmark, the number of cases of tuberculous mammitis among cows recently killed, was 584 in 1901-1902, say a proportion of 5.5% of all cows.

In this Province up to the present tubercular mammitis has been distinctly uncommon. Ten years ago when the experiments upon tuberculous catle were being conducted at Outremont for the Dominion Government, it was a matter of importance to obtain one or two cows exhibiting this manifestation of disease. Dr. McEachran, the late chief veterinary inspector for the Dominion, advertised extensively through the district around Montreal, to pay for cattle showing this condition. Only after two years was a case oifered to him, and that at such a figure that he could not venture to purchase it.

The milk of a single cow affected by tuberculous mammitis will infect as many children as may consume it. The milk of that cow diluted with the milk from several others cows, will be infinitely less dangerous; but it is still so, for on the one hand, the milk from an udder affected by tuberculous mammitis is generally very virulent and on the other hand, the milk, as such, has no destructive action on the bacilli, if anything it favours their continued vitality. If the number of bacilli be an important factor, their virulence is also.

(b) **The Flesh of Tuberculous Animals.** — Oxen, cows and swine are very subject to tuberculosis; sheep, goats and horses are relatively refractory to it.

Experiments made by the Royal British Commission of 1895 proved that by feeding guinea-pigs, calves and swine on uncooked tuberculous meat, tuberculosis is communicated to them.

Tuberculosis, it is true, rarely affects the muscle, or meat itself, but may be present between the lymph glands or on the surface of or between the muscles, and, in the process of preparation by the butcher as the infected parts are cut through their contents may be smeared over the meat. Thus there is real danger in giving sick people raw meat pounded to a pulp and commercial meat juices unless the meat comes from an abattoir subject to close supervision. In ordinary alimentation the danger is greatly reduced by cooking the meat. Nevertheless, it should be observed that prolonged and complete cooking alone destroys the bacilli in the middle of pieces of meat. Now, as a rule in the case of beef steak and roasts of beef, the outside only undergoes sterilizing cooking, while the middle remains practically raw, although as above noted the centre of a mass of meat is apt to show little signs of infection. But one must not lose sight of the enormous quantity of inferior meat, taken from all parts of non-inspected animals, which is not sterilized subsequently and which is used for canned meats ,sausages, pies and meat juices. It is a well-established fact that meat found to be of inferior quality for selling in the ordinary course of trade is used in the manner above mentioned. The danger therefore remains a real one and the supervision of abattoirs and slaughter-houses is

imperative. Pork especially should be the object of close supervision, for swine are still more tuberculized than the bovidae and a great source of infection for them is the skimmed milk which comes back from cheese factories and creameries to the farm. And this is a proof, to be added to those already given, that the tuberculosis of the bovidae is transmitted by milk to another kind of animal. Although the danger from milk and meat are in reality less than that from human infection, the fact must not be lost sight of that those who are primitively infected by tuberculous foods themselves become foci of human infection.

INDIRECT OR PREDISPOSING CAUSES

We have said above that if there is no Koch bacillus there is no tuberculosis. The bacillus is the necessary sine qua non, the causa causans, the only direct cause. Nevertheless, the mere presence of the bacilli does not always suffice for producing tuberculosis; the concurrence of certain causes is needed to realize infection. Such circumstances are on the side of the bacillus and on the side of the soil on which it falls. On the side of the bacillus, a certain degree of virulence is necessary; all the bacilli expectorated are not virulent, a certain number are needed, also an intense or prolonged invasion. On the side of the organism, there must be a weakening of the natural defences. This indeed is proved by the fact that the majority of mankind are, some day or another, exposed to contagion and yet, with 50%, infection is not developed or is limited. This is explained by the fact that some have opposed a sufficient strength of resistance to it, that others have been attacked only by bacilli that had no virulence or whose virulence was diminished and finally in many cases the exposure to infection or contagion was neither sufficiently intense nor sufficiently prolonged and the natural defences of the organism sufficed to ward off or arrest the disease. The natural means of defence against infection possessed by the organism are manifold; vitality of the white cells in the blood, the phagocytes, the proper working of the anti-toxic and eliminating organs. All this may be summed up in two words: proper nutrition. We will examine the circumstances that exert an unfavorable influence on nutrition, that weaken the natural defences of the organism and, on that account, are called pre-disposing causes.

Hereditary Predisposition

1. At the beginning of this chapter, we devoted a sufficiently lengthy discussion to the question of heredity to obviate the necessity of saying anything more on the subject. We will merely repeat that what is usually transmitted by heredity is a bad constitution, a defective nutrition compromising the efficiency of the natural defences which depend upon the vitality of all the cells. Hereditary tuberculizable soil is not the exclusive appanage of tuberculosis: it is also that of syphilis, of alcoholism and other infections and intoxications. It means that the child of tuberculous, syphilitic, or alcoholic parents

brings with him on coming into the world a general vitiation of his humours and cells which render him powerless in the face of microbial aggression.

Acquired Predisposition

2. But, in addition to this hereditary cause of general or local weakness, there are other circumstances which cause weakening of the organism and prepare it to be an easy prey to any infection. The **most important circumstances** which play the part as predisposing causes for tuberculosis are: overwork, insufficient alimentation, insufficiency of air, unhealthy dwellings, schools and workshops, and alcohol.

Fatigue and Overwork

(a) Experiments on animals clearly prove that continual fatigue or overwork weakens their resistance to every kind of infection. The same applies to man. Overwork also includes excessive intellectual labor, anxiety, emotions, as well as excessive physical labor; nervous or physical fatigue which always entails an expenditure of nervous strength, causes denutrition and with the latter a weakening of the natural defences of the organism; excessive work at school, premature work of children and women in factories, too intense or too prolonged labor among all classes of workers. Even robust men, such as athletes, young men too devoted to energetic sports, may unconsciously overwork themselves and become tuberculous. Examples of this are not rare.

Insufficient Food

(b) Insufficient alimentation naturally entails denutrition of all the cells and weakening of the organism. If, especially, insufficient food accompanies overwork, the matter is doubly serious, for on the one hand there is a drainage of strength and on the other insufficient repairing of it.

Alimentation, though sufficient, may be defective and it produces demineralization of the cells which is a great predisposing cause of tuberculosis. Pregnant women who nurse their children and do not eat proper food become demineralized and thus invite disease. The same applies to ill-fed school children and workmen who do not take food adequate to their physiological needs.

Insufficiency of Air and Sunshine

(c) Pure air is still more important than food for, if one can live several days without food, one can live only a few minutes without air. **The lack of ventilation in dwellings, schools, offices, workshops and factories is certainly the most powerful predisposing cause.**

The good quality of the elements that compose the blood depends in a very great measure, if not exclusively, on the purity of the air breathed, and purity of the blood is one of the most important means at the disposal of the natural defences of the organism. Through impure air, one becomes tuberculous, through pure air, the air cure, one is cured of tuberculosis. Good air,

good food and rest form a tripod on which the cure of that disease rests. Privation from pure air has such an effect on the organism that robust men and even animals end by succumbing to its hurtful influence. The action of impure air, as a predisposing cause of tuberculosis, has been well demonstrated by the report of the Army Commission respecting the health and life of our soldiers quartered in England (1858). That report has made the following eloquent facts well known: the mortality among English soldiers at that date (1858) was 17.5 per 1000; that among the civilian population, both urban and rural, was 9.2; in the city of Manchester 12.4; in the country 7.7 only. Why was the mortality among soldiers, men chosen for their stature, vigor and good health and performing physical exercises, higher than among the urban and rural population? Thorough investigation showed that the death rate among soldiers was chiefly due to tuberculosis. The cause was sought and was found to be lack of ventilation, over-crowding of barracks, defective drainage and defective removal of garbage. Vitiated air was therefore almost alone responsible for the high death rate among the soldiers.

Another observation completed the foregoing proof. At that time a British army lay before Sebastopol. The mortality among the latter was compared with that of the army in the barracks in England. The mortality in the army before Sebastopol was found to be 1-3 less; including deaths from battle and in accidents, it was only 12.5 per 1000 while that among the army in barracks in the mother country was, as already stated, 17.9 per 1000 for the infantry of the line and 20.4 for the guards. The former lived under canvas and breathed pure air, the latter lived in crowded barracks, badly aired and badly drained. The proof that the foregoing conclusions were well founded is that when the recomendations of the Commission were followed respecting ventilation of the sleeping quarters, mortality among the soldiers, due to tuberculosis, was reduced to a minimum.

Animals also afford a striking proof of the baleful influence of foul air. It is well known that with plenty of sunlight and where each animal has plenty of air-space, they retain their health and yield more milk, while those kept in small, dark, unventilated stables, become tuberculous. It is also known that cows kept in the open air, winter and summer, are cured of the disease. Professor Rutherford of the Ottawa Experimental farm cured a herd of six cows by this mean in the space of a year.

As to sunlight, although less necessary to life than air, it has also a considerable beneficent influence on nutrition. It possesses moreover a valuable disinfecting action. We shall see that lack of air and sunlight makes a dwelling a real hot-bed of tuberculosis.

Unhealthy Dwellings

(d) The unhealthy dwelling is one of the most powerful predisposing causes and to such an extent that **tuberculosis is a disease of unhealthy dwellings.** Tuberculosis reigns endemically in unhealthy houses and unhealthy sections. This truth has been fully demonstrated by the "Casier Sanitaire des

Maisons de Paris." That institution consists in the daily regular and methodical supervision of what occurs in houses from the sanitary standpoint; the number of cases of contagious diseases, mortality from such diseases, disinfections, sanitary condition of the premises, their description, etc., all these are recorded on separate files. By this means, at the end of a decade, very accurate statistics respecting the morbidity and the mortality in the dwellings and in the various wards of a city, can be made out. Very scientific experiments have been made in Paris under the direction of Mr. Juillerat who asserts that tuberculosis haunts certain houses called, on that account, **"accursed houses" (maisons maudites)** and also certain blocks of houses, certain streets and certain wards. The characteristic feature of these houses is that they are dark, not ventilated, front on narrow streets, never receive sunlight, have closed and dirty yards. Tuberculosis has been found more frequently in the lower stories, even with more spacious and less crowded apartments and on the contrary, less frequently in the upper stories — even when more crowded. This clearly proves that exposure to dust from the streets, lack of ventilation and of sunlight are more important factors than overcrowding. It proves that pure air and sunshine counteract the effects of overcrowding and poverty. Mr. Juillerat also found that tuberculosis is rare among the poorer population who live in huts outside the fortifications where there is an abundance of air and sunlight. This is fully confirmed by what happens among animals that have became tuberculous by living in stables and are cured and regenerated by life in the open air. It is also known that tuberculosis does not exist in herds of cattle living continually in the open air on the western prairies. Thus we are quite right in saying that tuberculosis is a disease of dwellings. This does not mean that the dwelling wholly creates the disease, but it cumulates all the most favorable circumstances, firstly for the etiolation (fading) of the human plant and then for the culture and transmission of the germ. Lack of pure air and sunlight wither the human plant; dampness causes the congestion of the respiratory organs; dust irritates those organs and conveys the morbid germ; darkness and dampness preserve the vitality of that germ for months; overcrowding multiplies infinitely the occasions of contact between the occupants of a dwelling and favors transmission. All these favorable circumstances for the weakening of the human organism or the preservation of the seed or microbe — the transmission of the morbid germ, — are gathered together in the unhealthy dwelling.

But, there is still more: the latter may even transmit the fatal bacillus deposited by the first sick person. Out of 340 phthisical patients in whom Mr. Bernheim sought for the origin of the disease, he found that, in 120 cases, the contagion had its source in dwellings. **"Wherever** he says **a phthisical patient has lived or has died, one may be sure that other subjects will be contaminated if the dwelling be not methodically disinfected."**

The "Casier Sanitaire de Paris", has fully proved the succession of cases of contagion in the same dwelling. The same has been ascertained in New York, where an enormous block of houses situated between four streets;

Houston, Catherine, Sherry and Market, has been called the "Lung block" on account of the tuberculosis that inevitably attacked those unfortunate enough to enter it as tenants. It was therefore condemned and pulled down. The city of Hâvre, France, affords a striking proof of the influence of the dwelling on the evolution of tuberculosis. That city, notwithstanding its proximity to the sea, has the highest urban death-rate, 52 per 10,000 inhabitants? But here is a precise fact showing the influence of the dwelling. The number 52 is unevenly distributed through the city; thus, instead of 52 per 10,000 inhabitants, it is 92 in a single ward, the old Albannais ward, and only 1 per 10,000 that is 91 times less, in some healthy houses erected by a building society which, under the direction of Mr. Siegfried, builds cheap houses for the workingmen. The same has been found in Liverpool and London, England, where they have succeeded in lowering the rate of mortality from tuberculosis, notwithstanding a cloudy and damp climate, merely by making dwellings and streets healthy. The dwelling is oftened rendered unhealthy by the street.

Unhealthy Streets

(e) The part the street may play in the propagation of tuberculosis is mathematically shown by the **Casier Sanitaire de Paris.** Thus Mr. Juillerat finds that, in streets of ordinary width, the average mortality from tuberculosis is 6%; in the narrow streets 16.46% and in very narrow streets it has risen to 18.84%

He then observed that street dust raised by wind, by the passing of vehicles, contributes to the unhealthiness of the lower stories, even when overcrowded.

The public health authorities must take action to reduce the quantity of dust in the streets to a minimum.

To sum up: Narrow streets into which sunlight never enters, dusty and bordered by high houses, huddled together, infected lodgings, small damp yards, lack of air and sunlight in dwellings, all these are factors of great importance in the tuberculization of the people. It should also be added that, in too many instances, ignorance converts dwellings possessing all the elements of health into unhealthy dwellings by preventing air and sunlight from entering, by windows being darkened by curtains or blinds, the air being superheated and vitiated by gas jets, vitiated also by the dust raised by dry-sweeping.

The School

(f) The school is the dwelling of childhood and youth. What the youth is, such is the future individual.

Now the school surroundings expose the child to an accumulation of unfavorable circumstances and defective conditions calculated to hamper his normal evolution and affect his health at a very critical period of his life, when he should be surrounded by irreproachable hygienic conditions. In fact at a time when the child should have an ample provision of pure air, sound and

CHILDREN'S MEMORIAL HOSPITAL, CEDER AVENUE, MONTREAL.

abundant food, exercise; at a time when his organs are in process of formation, school life brutally imposes on him long hours in vitiated air, breathed over and over again, the eating of food inadequate to the two fold physiological needs of the age of growth, a hampering and distressing sedentariness, and too long sustained excessive brain work. In addition defective furniture compels the child to assume wrong attitudes which tend to cause malformation of the vertebral column and the thoracic cage resulting in the creation of a condition of receptivity for tuberculosis. Finally, promiscuousness in schools enormously multiplies the chances of tuberculosis contagion. It is true that in most instances the tuberculosis of school children is rather ganglionic and affecting the bones, that is to say, not open and consequently not infective. There are however some rare cases of open pulmonary tuberculosis which may cause a class epidemic as there are office epidemics. Moreover, there is a real danger of contagion from the teachers because they are more subject to laryngeal tuberculosis than the members of any other profession.

In any case, the school with its promiscuousness, its dusty, foul and infectious atmosphere combined with sedentariness and overwork, constitutes a powerful cause of impoverishment of the system in children, and is a predisposing cause of tuberculosis. Many children infected amid family surroundings, would possess sufficient resistance against infection if the school with its depressing conditions of life did not take away from the child the chances of a victorious struggle against the bacillus.

The greatest danger in school is the foul atmosphere in which children and adolescents stay too long. To prevent lowering of vitality and encourage a healthy sound development is one of the essential points of the campaign against tuberculosis.

Unhealthy conditions of labor, offices — workshops — factories

(g) After the ordinary dwelling that shelters the family, collective habitations such as offices, workshops, factories, play an important part as a predisposing and even a determining cause, because they are apt to present the same defects, as have been pointed out in connection with unhealthy dwellings: lack of air and sunshine, gas light, dust, uncleanliness; add to these, smoke, mineral, organic and metallic dust, this last being particularly injurious; overwork, through premature or excessive labor; and promiscuousness which eminently favors contagion.

Statistics show that industrial centres present a morbidity and mortality from tuberculosis greater than centres of the same population that are not industrial. Statistics also very manifestly show that trades where metallic, mineral and organic dust is produced are especially tuberculizing. For this reason **"dusty trades" are "Tubercular Trades".**

Statistics also prove that work in a confined atmosphere is much more debilitating than that performed in the open air, however hard it may be. This is a reason for diminishing as far as possible the action of hurtful influences in the atmosphere of offices, workshops and factories.

Such hurtful influences are: lack of ventilation, of sunlight and cleanliness, the absence of precautions against dust and contagion. Premature labor of children, work without interruption by women, excessive work by men, women and children in factories, are especially a cause of organic depression, of etiolation and predisposition to tuberculosis which is a disease of the working classes; for the greater number of its victims are taken at the working age

Alcoholism

Alcohol is a predisposing cause, directly by weakening the natural defences of the organism and indirectly because it causes the alcoholic to bequeath physical degenerescence to his descendants and also give rise to a number of secondary anti-hygienic causes

Directly: it diminishes vital resistance by impairing the normal working of the nervous system which regulates all the actions of nutrition; by impairing the normal working of the liver which is the protective organ agains the the invasion of poisons; by diminishing the vitality of the white blood cells, the phagocytes, which are most effective agents in destroying disease germs, and finally, by physically irritating the pulmonary tissue and, by such traumatism, preparing the way for microbic aggression Everybody knows the hoarse voice of the drunkard due to irritation of the respiratory organs by the elimination of the alcohol. There is, moreover, a classic theory in medicine that the alcoholic is subject to pneumonia and cannot resist it.

Indirectly: alcoholism is a factor of tuberculosis:

1. Because the latter crops up with painful frequency in the weakened and degenerated lineage of alcoholics;

2. Because alcoholism invariably produces conditions of life which are unfavorable to health.

Children who receive a weak constitution as a legacy from alcoholic parents already present a good soil for the culture of the tubercle bacillus. Then, such children, living in depressiong conditions of life, cannot acquire what nature has refused them; on the contrary, the ever increasing inroads on the family means through the father's improvident conduct leads gradually but surely to straitened circumstances at first and afterwards to penury, to unhealthy houses, insufficient food, depressing anxieties, defective nourishment and impoverished vitality which are the most powerful predisposing causes. Professor Landouzy was therefore right in saying that "alcoholism makes a bed for tuberculosis."

If all physicians are not unanimous in recognizing alcohol as a factor of tuberculosis, it is because the question is either wrongly put or wrongly understood. It must be understood, when it is said that alcohol is a cause of tuberculosis, not that it wholly creates tuberculosis, because there is only one cause which creates it and that is bacillary infection — but that alcohol is a very prominent predisposing cause, either directly or indirectly. Thus put and thus understood, the question of relation between alcoholism and

tuberculosis should be agreed upon by all physicians. Such unanimity prevails among the French masters. The following concise statements prove it: "Phthisis is caught on the tavern bar" (Professor Hayem) "Alcoholism is the **billetting-officer** of tuberculosis" (Professor Duclaux) "Alcohol is one of the chief causes which predispose the organism to bacillary attacks" (Professor Lancereaux) "The growth of alcoholism in France is in proportion to that of tuberculosis" (Lagneau) "The campaign against alcoholism becomes, as it were, a campaign against tuberculosis". (Chiren de Boissy) "A prophylactic measure against tuberculosis would be the suppression of alcohol." (Tharam) "After 30 years, alcoholism has to its credit nine-tenths of the Parisian working men affected by phthisis." (Professor Letulle). "Mortality from tuberculosis increases in the same ratis as the consumption of alcohol." (Professor Brouardel). Finally, quite recently, Dr. Bertillon, the great French statistician, basing his assertions on his statistics, said: "Thus it appears that it is alcohol that regulates the distribution of phthisis on French territory, that is to say, that, of all the causes that prepare us to receive the tubercle bacillus, none is more effective than alcohol. The other causes, more numerous and more complicated, give way to it. It is the master."

Dr. Bertillon, comparing the mortality from tuberculosis among tavern-keepers to that among shop-keepers of all kinds, finds the figures of the former twice as high. Thus: —

	Shop-keepers	Tavern-keepers
From 25 to 35 years	214	465
" 35 to 45 "	245	579
" 45 to 55 "	244	403
" 55 to 65 "	201	242

Not only is this mortality from tuberculosis higher among the sellers of alcohol, but also the general mortality, especially through diseases of the respiratory organs, the nervous system and liver. Thus: —

Between 35 and 45 years.	Shop-keepers	Tavern-keepers
Alcoholism	28.7	226
Pulmonary phthisis	245	579
Diseases of the respiratory organs	139	318
Diseases of the nervous system	93.8	210
Diseases of the liver	33	210
Diseases of the circulatory system	98.4	196
Diseases of kidneys	31.6	70.4
Accidents	39.5	73.6
Suicides	25.5	49.4

Thus, the rate of general morbidity among tavern-keepers is between thirty-five and forty-five years, it is much higher than among shop-keepers who nevertheless live in the same social conditions.

Dr. Bertillon, has also drawn up a chart of France by departments, in the first place as regards the consumption of alcohol and then as regards mortality from tuberculosis and both are almost identical. The northern departments, which are not vine-growing and where more alcohol is consumed, are the most ravaged by tuberculosis; the latter becomes rare on the contrary in the southern and western departments which are wine-producing.

"Thus, says Dr. Bertillon, alcohol and tuberculosis are brother and sister and wine and alcohol are two hostile brothers."

Previous statistics, those Dr. Lavarenne, recorded in the report of the Commission of 1905, have also proved that parallelism between the consumption of alcohol in the different regions of France and the mortality from tuberculosis. Thus:

Litres of alcohol consumed per head and per annum.	Deaths from tuberculosis per 10,000 inhabitants.
12.47	30 to 40
14.72	40 to 50
15.21	50 to 60
16.36	60 to 70
17.16	70 to 80
17.30	80 to 90

The parallelism is striking.

If we pass over to England, we find a great authority. Dr. Newsholme, who says: "That alcoholic indulgence favors the occurence of phthisis is shown by abundant evidence and is well recognized". "Alcoholism, like excessive fatigue, loads the circulation with toxic matter, diminishes the normal phagocytic action of the body cells and makes individuals more prone to every form of infection and **especially tuberculosis.**

In the United-States, an authority on tuberculosis, Dr. Flick, Director of the Phipps Institute, says: "As to the influence of alcoholism on tuberculosis, the only fact which stands out prominently in our statistics is that it is pernicious. The mortality among those who admit a history of alcoholism, is 100% higher than among those who deny it; and the mortality among those who admit a history of alcoholism in the preceding generation is about 80% higher than the mortality among those who deny it. The percentage of improved in non-alcoholics is about 30% greater than the percentage in alcoholics and the percentage of improved in those who deny a history of alcoholism in preceding generations is about 10% greater than in those who admit it.

With us, the baleful influence of alcohol also makes itself felt, here is a proof of it. Dr. Paradis, of St Thomas de Montmagny, reported to the Congress of the French-speaking physicians of North America, held at Three Rivers, in 1906, the observations he had made on 107 families of tuberculous persons. Out of these 107 families 87 were contaminated by alcoholism

through their head or through alcoholic ascendants; 35 of those families, belonging to well to do classes in industry and in trade furnished 67 victims to tuberculosis in 10 years; 32 other families of poor working men furnished 102 victims in the same period; 20 other alcoholic families of farmers, who consequently live in the open air, furnished 27 victims to tuberculosis. On the 186 victims 57 were confirmed drunkards, 59 used alcohol to a more or less great extent, 27 were the drunken issue of drunken fathers; the 43 others did not drink alcohol, but were the descendants of fathers or grandfathers who were alcoholics.

Tobacco.

Everything that weakens the organism below a certain limit is a predisposing cause of tuberculosis. It remains but to meet the seed, the morbid germ, to realize the necessary conditions for the evolution of the disease, because a **weakened soil is ready to favor infection. Now tobacco is, more particularly for children and adolescents, especially school-boys, a source of weakening organism,** its toxic action bears upon the nervous system which regulates all the functions, and on the digestive organs upon which the assimilitation of food depends. **Tobacco is the alcohol of children and adolescents.** All teachers are unanimous in asserting that as soon as a school boy begins to smoke he begins to grow pale, to eat less, to not digest so well, to sleep less, to lose attention and memory. ... .

But, tobacco is hurtful even to adults. This is what observation at the Phipps Institute for two years has revealed. Dr. Flick says: **"As with alcohol so with tobacco."** The mortality was much greater among those who used it than among those who did not use it. During the fourth year, 18.58% of those who used tobacco died as compared with 5.15%of those who did not use it; and during the current year, 15.30% of those who used tobacco died, as compared with 13,51% who did not use it. For the two years, the excessive mortality among those who used tobacco over those who did not use it is as great as the excessive mortality among those who used alcohol over those who did not use it. The striking preponderance of mortality among the patients who used alcohol and tobacco, as compared with those who did not use them, warrants abstinence on the part of all who are suffering from tuberculosis in an active form.

Poverty

Many regard poverty as the chief puveyor of tuberculosis. It is certain that the latter is the disease of the people and of that portion of the people who lodge, clothe and feed themselves badly, who live in unhealthy, crowded and dirty quarters. But poverty is too complex a matter to permit us to estimate with precision the share of responsibility devolving upon each of its component elements. At most we recognize that poverty moves in a vicious circle made up of the following elements: unhealthy dwellings, overcrowding, uncleanliness, multiplied chances of contagion, alcoholism, anxiety, privations, demoralization. In this circle of causes and effects, are effects that

become causes in their turn. How then can the preponderating elements be disentangled?

All the elements above mentioned are certainly causes of vital depression and consequently, predisposing causes of tuberculosis, but some are preponderant and others secondary. It is certain that poverty can exist without tuberculosis if the elements essential be lacking, that is to say, infection or contagion. Every physician has certainly seen poor people, weak people, live a fairly long life without becoming victims to tuberculosis, just as he has seen well to do and even rich people die of consumption. We know that our rural population of the Province of Quebec suffer in nowise from poverty, on the contrary and yet they are ravaged to a serious extent by tuberculosis; thus poverty alone does not explain tuberculosis, a disease which respects no social stratum and which attacks poor social strata to a greater degree because the latter are more exposed to contagion, to the depressing influence of unhealthy dwellings and to the baleful action of alcohol. This does not mean that it is not necessary to strive unceasingly and by every means to reduce poverty to the possible minimum, but as this is an ideal of very remote realization, it is urgent to attack the causes to be found in all social strata and which are consequently preponderant. The first three most important causes are: **infection either in the family or in gatherings, unhealthy dwellings and alcoholism.**

B.—CAUSES PECULIAR TO THE PROVINCE OF QUEBEC MEDICAL REFERENDUM

To ascertain whether there are special causes of tuberculization in our province, the Commission had recourse to a Medical Referendum. Every physician in the Province received a list of twenty precise questions, with a request for an answer. A stamped envelope for the answer was enclosed with the letter. Out of 1800 physicians, 338 replied. These answers from those who are best qualified to give information to the Commission throw sufficient light upon the preponderant causes of tuberculosis in our Province. The following is a summary of the opinions of the medical body on each question.

1. **Do the figures of the enclosed official statistics represent in your opinion the real extent of tuberculosis in your district?**

Summary of the answers:

No, the official statistics do not give the real extent of the disease because 1. Statistics for the country parts are not made up as well as in the cities, because many cases are wrongly designated, because physicians sign only a little more than one half the death certificates; 2. Statistics of mortality take only deaths into account, but there are living consumptives who should be counted in order to get an accurate idea of the extent of the disease in the Province. Thus, the general opinion is that the present official statistics are far below the truth. Notwithstanding this if we compare them with those of countries whose statistics are carefully compiled they reveal an excessive and avoidable mortality.

2. Statistics show that mortality from tuberculosis is higher among women than among men. Is this the case in your district and why?

Summary of the answers:

The prevailing opinion is, in fact, that the **French-Canadian woman pays a heavier tribute to tuberculosis than man.** 1. Because in the first place she remains more in the house and pays no heed to renewing the air in her house, so that excessively sedentary life and lack of pure air make her lose her appetite, cause bad digestion, defective nutrition and etiolation and if the dwelling is at the same time unhealthy through darkness, dampness or overcrowding she feels its hurtful influence still more on that account; 2. In a great many cases lack of proper care after confinement keeps women in an almost continual state of weakness; 3. They are more exposed to contagion because if there is a consumptive in the family they have to attend him and live constantly with him; 4. Girls fade away, first of all at school, then in the convent where they live in a vitiated atmosphere and do not get enough exercise in the open air; finally they fade away, and become infected in factories especially in the United States whence they return ill to sow infection in their families: or else with constitutions already impoverished they marry young to succumb sooner or later under the burdens of matrimony; 5. Young girls and women also, either through ignorance or to follow fashions introduced from other countries, make many mistakes in connection with their dress in cold seasons. Thus women feel more than men the baleful influence of vitiated air and unhealthy dwellings: 6. They are also subject to drainage of vital strength through lack of proper care after confinement. Finally in the house, as in the factories they take no precaution against contagion. The instruction given our women is greatly deficient, there is a total lack of hygienic notions as to the most important matters of family life.

3. — Why is mortality from tuberculosis higher among French-Canadians than among English-Canadians?

Summary of the answers:

English-Canadians as a rule are much more careful as regards hygiene of the person, of the dwelling, and of the food, they know the importance of pure air and they are very particular about their houses. Great attention is paid to physical training in their schools, high schools and universities. They have a better idea of the source of diseases and submit in an exemplary manner to the laws respecting public health. All the English physicians answered that they are satisfied with hygienic conditions of their schools. Finally, as a rule, English-Canadians occupy higher positions where they get better salaries and are less exposed to unhealthy influences. The French-Canadians, on the other hand, furnish the great mass of workers in less remunerative occupations, in industry where they are exposed to so many unhealthy influences as regards both the kind of work itself and the factory Thus 100,000 French-Canadians will furnish a much larger proportion of working men than 100,000 English-Canadians. Now as industrial labor is

the hardest and entails greater exposure to tuberculosis, it is natural to find more consumptives among French-Canadians. Several physicians reply that quite the half of French-Canadians who return after having worked in factories in the United States come back tuberculized and spread tuberculosis contagion in their families. French-Canadian families are larger; they consist of from eight to twelve members as a rule. The result is that dwellings are overcrowded, air is more easily and more rapidly vitiated, the children receive less attention individually and are obliged to go and work in factories at too early an age. Those who go to school find there a vitiated atmosphere which continues the etiolation begun at home. French-Canadian physicians are unanimous in condemning our schools as regards cubic space and floor space. A great many schools have less than 150 cubic feet of air space while. in the United States, it is considered that the minimum should be 200 and 250 is recommended. Our educators do no pay sufficient heed to the physical education of youth and the teaching of hygiene. Notions of hygiene applicable to domestic life are lacking among the French-Canadian population. Thus, they have a very erroneous idea of disease and this entails very grave consequences. French-Canadians are fatalists; they think that diseases are sent them by God, by Providence; that they themselves have nothing to do with it; that diseases are not avoidable. The result of looking at disease from this point of view is that as a rule they do not believe in the contagiousness of many diseases, especially of tuberculosis which they attribute to heredity; they wait too long before getting their sick attended too and finally, they console themselves too easily for the loss of a relative or of a child believing that his time has come. Another consequence of such a fatalist conception of the disease is that they submit very reluctantly to the health officer's intervention, the physician's advice is followed very carelessly. To ignorance of the elementary notions of hygiene are due excessive infantile mortality, the large number of rachitic children and the higher mortality from tuberculosis among French-Canadians. It is urgent that the teaching of hygiene be made obligatory in all schools and other educational institutions.

4. Are you aware of any facts showing that immigration contributes to the increase and spread of tuberculosis in our province?

Yes, immigration contributes to the spread of tuberculosis especially in cities, because a great many, three-fourths, of the immigrants come here poor and live in deplorable hygienic conditions during the first years; they take any kind of house, the oldest, the most unhealthy, the dirtiest, the most infected and those that are discarded by others; whole families live in one room. Physicians who are sometimes called upon to attend Syrians, Jews, Poles, Russians or Italians are painfully impressed by what they see. Nearly all the Syrians are tuberculous and their children rachitic. A great many Jews are also tuberculous because they work in small unventilated, dirty and crowded shops which cannot fail to have a depressing effect. As to the Italians the proof that they are becoming tuberculized is that complaints are made in their country that tuberculosis is increasing there owing to the return of a great

many sick. The uncleanliness of a city, overcrowding of dwellings, foul air and defective food are tuberculizing elements of the highest importance and immigration brings all of them to us. Let any one examine the wards in which immigrants reside and it will be found that public health is compromised by them.

It is true that there is a law allowing the deporting of any immigrant who has became tuberculous within two years after his arrival, but in reality the enforcement of this law is exceedingly difficult because immigrants are notoriously nomadic; and as they become aware of the law they conceal themselves from the health authorities. Moreover, physicians generally are ignorant of the law and do not report cases to the health authorities.

Still further evidence of the fact that immigration contributes to the increase of tuberculosis in the province is furnished by the following statistics applied to the Commission by Dr. Harding, the Secretary of the Anti-Tuberculosis League of Montréal who says: "During the year 1904 30% of the persons treated were born in Montreal, 30% in the province of Quebec, 5% in other parts of the Dominion and 33% were strangers. Of the latter 60% had been less than a year in the city." Several physicians, among others Dr. G. Kennedy, Dr. J. A. Hutchison, Dr. R. N. MacRae, Dr. Alfred Marcil, report cases of immigrants from England with open and consequently contagious tuberculosis.

But there is also another immigration already noted which contributes probably more than that of foreigners to the spread of the disease and that is the immigration of our own people who after working in factories in the United States return to their families in a more or less advanced stage of tuberculosis. Dr. Prevost of Sorel says that one half of the consumptives he treats are Canadians who have come back from the United States where they became infected and who, in their turn, infect their relatives in Canada. Dr. Vanasse of St. Liboire says: "I have found that, during the past five years nearly all the consumptives treated here came from the manufacturing centres of the United States. This kind of immigration should be closely watched.

5. **What are, according to your experience, the most important causes of tuberculization in families?**

The following are the answers to this question in the order of their importance:

1. Infection.
2. Hereditary predisposition.
3. Unhealthy dwellings.
4. Alcoholism.

Thus, **physicians are almost unanimous in acknowledging contagion as the preponderant factor** and among the predisposing causes, the influence of hereditary predisposition and predisposition due to unhealthy dwellings and alcoholism.

6. **What are, in your opinion, the unhealthy conditions in dwellings which play the most important part as a predisposing cause?**

Physicians are in the greatest accord in acknowledging that the **chief fault among our population is neglect to ventilate their houses.** French-Canadians have not been taught at school, or anywhere, that pure air is an element of life more necessary even than food and that vitiated air is man's greatest foe.

Another point upon which general ignorance prevails in our Province is the vivifying and disinfecting action of the sun's rays. Such ignorance is so profound that people even seem to be prejudiced against these two agents of life and health, for unheard of precautions are taken to guard against them; notwithstanding the double windows and caulking of their sashes with wadding or with paper glued around them, the entrance of sunlight is prevented by curtains or blinds, and thus people live without renewing the air and without sunlight throughout the year; in winter, under the pretext of protection from the entrance of cold air, and in summer, of hot air. And, as French Canadian families consist of from eight to twelve members and their dwellings are usually small, there is not enough air for each member and as, further, the air is not renewed by ventilation, all live continually in air that is vitiated and breathed over and over again; **This is one of the chief predisposing causes of tuberculosis.** It is aggravated by the fact that French-Canadians have the bad habit of choosing the smallest apartments for bedrooms and of keeping the largest and best-lighted one for the parlor, which is only used occasionally. There are, especially in cities, too many **dark flats** which receive the sunlight directly only in front and in rear indirectly by skylights in the centre. **Most of those flats have a dark room,** generally intended for the servant, who, when she has become tuberculized, carries the disease from house to house and finally goes to her home in the country to infect her relatives there who shelter her when she can no longer work.

After lack of air and sunlight the chief defect in our houses is **dampness.** All the country houses are not protected against the dampness of the soil. Nevertheless dampness plays an important part in the preparation of a person for tuberculosis, by causing lasting colds. In cities, nearly all basements and ground floors are damp owing to immediate contact with the soil.

Finally, the **infected dwelling** plays a rather prominent part with us because Canadians living in cities are very fond of moving and as everybody moves on the same day, the first of May, people have no time to disinfect a suspected house. Moreover the rather prevalent ignorance among our population regarding the infectious nature of tuberculosis, prevents their thinking of such precautions.

7. **Do you know an example of a dwelling infected by a tuberculous family, transmitting tuberculosis to another family, replacing it in such dwelling?**

A great many physicians cite cases of infection from dwellings. The

following is a very typical case and it was found in the country. "I found that in a single house, in the space of 7 or 8 years, four families had lost five members from tuberculosis owing to the house being infected." (Dr. Prevost St. Jérome) "I know of two houses where there died a tuberculous member of each of three families which **succeeded one another in it** without interruption in the space of three years." (Dr. Marleau, St. Jérôme). "I had recently two cases of tuberculous meningitis in a house previously inhabited by a consumptive woman. That house was not disinfected." (Dr. Grenier, Ste. Agathe des Monts). "A family consisting of a mother, a young daughter and two boys moved in the month of May. Two months afterwards the girl began to cough. She was quite healthy until then. Diagnosis by two physicians pronounced the case to be one of pulmonary phthisis. Two months previously, a young man had died of tuberculosis in the house occupied by the girl. There had been no disinfection." (Dr. Alfred Marcil, Montreal.) "A family I have attended for many years and which showed no hereditary predisposition and whose children were in good health bought a house in which a consumptive had lived. Shortly after the children became Denver." (Dr. Cameron, 605 Dorchester Street, Montreal). "Yes, especially tuberculous one after the other. Some were sent away to Saranac, others to after May moving", replies Dr. Vipond. "Past year (1909) I found eight deaths from tuberculosis due to an infected house." (Dr. G. Hall.) "Yes a student caught tuberculosis through occupying a room previously inhabited by a consumptive. I have another very clear example of infection through lodgings. A young man contracted phthisis and died; the family moved away; the next tenant contracted the disease although he presented no predisposition." (Dr. Lynch, Sherbrooke). "A student in excellent health occupied a room previously inhabited by a tuberculous; he became tuberculous in three months." (Dr. Orr, Montreal). "The owner of several badly lighted tenements was in the habit of occupying them one after the other when they were not rented. He and his wife were consumptive and died. To my knowledge, **about twenty cases of tuberculosis originated in those lodgings infected by the tuberculous owner,** and I speak only of what I was able to observe. Almost every lodging furnished one or more cases. In one lodging the father, the mother and three children were tuberculized as well as a strong young girl who boarded with them" (Dr. G. G. Robins). An exactly similar case is reported by Dr. MacKay of Sherbrooke: — "A proprietor had four houses to rent. When one was vacant he occupied it. He was tuberculous. The mother and daughter of a perfectly healthy family contracted tuberculosis. In another family also, the mother and daughter contracted tuberculosis shortly after leaving the house. A young married lady showed incipient signs of tuberculosis while living in one of the houses. A gentleman who had a previous pulmonary history became unmistakably tuberculous shortly after leaving the house. A lady had an attack of pleurisy which was positively tuberculous." Here is another very precise story of infection through infected lodgings. "In a village of

Dorchester county, a family lived in a house. The husband and wife died of consumption in that house. The latter was bought by another person who died of consumption. A third person then inhabited the house, his wife fell ill and went away. Recently a fourth person occupied the house and his wife died of phthisis." (Dr. W. J. Enwright), "My eldest son occupied a room in a boarding school of Montreal, in which a consumptive had lived and my son contracted phthisis and died three years afterwards." (T. C. Gaboury).

A great many other examples are given of tuberculosis contracted from dwellings Our people are wholly ignorant of this source of tuberculous infection. Now, the consumptive infects the house by expectorating on the floor and, as many physicians observe, Canadians spit a great deal and everywhere. The people must be educated on this point. It would be better to change the custom of moving in May. If all moving did not take place at the same time, tenants changing houses would have time to get the new lodging disinfected if suspected.

8. **Do you know of any example of contagion due to the promiscuity of tuberculous individuals with healthy individuals gathered together in the offices of large establishments, workshops, factories, hospitals, asylums, nurseries, prisons, schools, colleges, convents, etc., etc.?**

"Such things are of daily occurrence" says Dr. Tanguay. "I may cite the following case: four employees working in the same corner of a room were infected in the space of five years and died. That corner was disinfected and there have been no cases since two years". (Dr. J. Stevenson). "I saw a young man employed in a railway office replace the book-keeper who had died of tuberculosis and become tuberculous himself." Still other cases: "An accountant, 50 years old, who audited the books kept by a consumptive, became tuberculous." (Dr. Ashton Kerr.) "A young man employed in a bank caught tuberculosis from the chief clerk who was consumptive and who spat on the floor." (Dr. A. Schmidt). "As we have had manifest proof that patients whose general health was good, contracted tuberculosis through being in contact with consumptives, we now take the precaution to isolate the patients." (Dr. Burgess, Superintendent of the Protestant Asylum at Verdun.) "Yes, I know of many cases, the following among others: A healthy young girl, 18 years old, caught tuberculosis from a companion working besides her in a factory at Lowell. She came home to die among her relatives in Canada and communicated the disease to three of her sisters". (Dr. de Lancey Johnston, Richmond). "In a furniture factory, a strong young man, without any herditary predisposition, worked with two sick employees who coughed and spat on the floor; he is beginning to cough himelf and has symptoms of tuberculosis" (Dr. J. L. Masson). "Yes, I know of two cases of tuberculosis contracted in offices and of several contracted in convents." (Dr. A. Lesage). "I have found a great many cases of tuberculosis in religious communities of women. In one community they even say it is the way to die." (Dr. Cloutier). "I know a class of rhetoricians

consisting of 29 students 9 of whom died in succession of tuberculosis after a schoolmate affected by that disease who spat profusely on the floor of the class-room." (Dr. J. H. Beaudoin, Lachine.)

"A servant in the service of a consumptive, died after contaminating all her four sisters who also died of tuberculosis. (Dr. Prevost of St Jérôme.)

And many other typical examples of contagion from life in common follow. These suffice to prove that precautions must be taken wherever people are gathered together as in schools, boarding-schools, offices, workshops, factories, asylums, hospitals, prisons, etc.

9. **Do you know of any teachers affected by open pulmonary tuberculosis, who continue to teach?**

"I have known several" replies Dr. Cléroux. "Yes," reply Drs,. E. Dubé, and Blackader of Montreal; Darche, of Sherbrooke; Lesage, of Longueuil; Berthiaume, Prévost, of St. Jérome, etc. "I have at present under my care in the hospital a teacher with open pulmonary tuberculosis who continued to teach in a country school until the eve of her entrance into the hospital." (Dr. Mathieu, professor of Laval University, Quebec.) "Yes, especially among the religious teaching orders," replies Dr. Panneton of Three Rivers. "I know of such cases, and they are many, especially among the religious communities of women. Hold even a slight investigation among nuns and you will be surprised." (Dr. E. C. Dagenais). The teaching religious communities of men also have a great many tuberculous professors as testified by the death certificates by the Provincial Board of Health Here is an example: "last year I found a Brother who taught and had charge of pupils, who coughed and even had hemorrhages. I have been practising here for 15 years. When I first came, the Brothers had but one corps in their cemetery, now there are about 50, nearly all killed by tuberculosis." (Dr. Blondin). This statement is corroborated by the following. "The director of a school with 600 pupils recently told me that his professors, after teaching two or three years, were sent to the infirmary affected either by tuberculosis or by neurathenia. It should be observed that there is almost no ventilation in that school." (Dr. E. Gagné, inspecting physician of schools, Montreal). Dr. R. C. Patterson of Ste Agathe des Monts, reports the following case; "a teacher, now dead of tuberculosis, continued to teach while he coughed and while his disease developed, consequently several children then and afterwards showed signs of tuberculous infection."

Answers in the affirmative are very numerous among French-Canadian physicians and, on the contrary, very rare among English physicians. This is explained by the fact that the French schools are not ventilated, while the English ones are. All these facts and many others prove that much remains to be done in connection with schools and boarding schools.

10. **Do you know of any children afflicted with open tuberculosis who continue to attend school?**

Most of the physicians reply in the negative, but some reply in the affir-

mative. This agrees with what happens in other countries where it is unanimously stated that the tuberculosis of childhood is rather glandular or of the bones and more rarely open tuberculosis. The danger of contagion in schools, from pupil to pupil, is much less in reality than that from teacher to pupil.

11. **Are the class-rooms in our schools of sufficient dimensions for the number of pupils attending them, namely the minimum of 150 cubic feet of air space per pupil, as required by the health laws of the province of Quebec?**

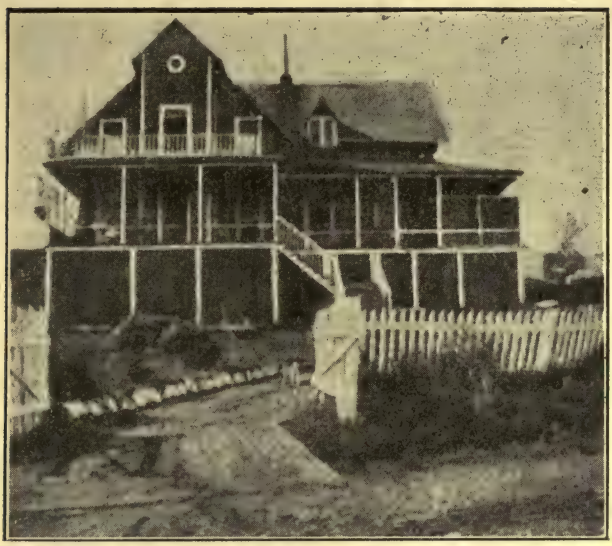
"Exceptionally" replies Dr. Lessard of Quebec and such is the answer of nearly all the French-Canadian physicians while all the English physicians almost unanimously state that their schools do not leave much to be desired in this respect.

"Overcrowding is the general rule in all the schools of the province of Quebec" says Dr. C. P. Paquin. "All the schools are hot-beds of microbes; they are too small, badly ventilated and overcrowded," (Dr. Cloutier, Rimouski County). "I do not think there is a single school in my locality which meets the requirements of the law." (Dr. Blondin, Arthabaska). "Most of our schools are far from being what is required by the sanitary laws." (Dr. E. E. Darche, Sherbrooke.) "I do not think a single school is in accordance with the sanitary laws." (Dr. G. Gervais, Berthierville.)

Conclusions: — The physicians from all parts of the province complain of the overcrowding of the schools and of lack of ventilation, but the English physicians are satisfied with their schools which give the children sufficient cubic air space and floor space. Do we not find in this a beginning of the explanation of the higher rate of mortality from tuberculosis among French-Canadians than among English-Canadians? For when the child's vitality is weak, even at school, he afterwards resists less strenously the depressing influences that await him in family life and in industry.

12. **Are your schools provided with sufficient means of ventilation to assure the children twenty-five cubic feet of air per head and per minute, as required by law?**

"Exceptionally" says Dr. Lessard of Quebec. "About two thirds of our schools in Montreal have not sufficient ventilation according to law." (Dr. E. Gagné, inspecting physicians of schools.) Dr. J. S. Laberge, director of the medical inspection of schools in Montreal, in a communication to the Sanitary Service Congress, held in Sherbrooke, stated that **there is no ventilation in the majority of our schools.** The same applies to Sherbrooke, according to Dr. Darche. It is the same throughout the province of Quebec. The **thousands of children who attend school are thus subjected to physical depression** by breathing air that is vitiated and foul from being breathed over and over again, devitalized This explains why our population, as a rule, pay no heed to the renewal of air, because the child has never learned it at school. The English pay much more heed to ventilation, probably because they have learned at school how important is the renewal of air. This is a very important point in the campaign against tuberculosis. Pure air is the best preservative



BREHMER REST, STE-AGATHE-DES-MONTS

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against tuberculosis, since it constitutes the most important element of the treatment.

13. **From your experience, is infantile tuberculosis due to hereditary predisposition, infection by milk, family contagion or contagion in school?**

Physicians are almost unanimous in acknowledging that family contagion plays the most important part in infantile tuberculosis; then infection by milk from tuberculous cows. Parents should therefore be instructed on these two important points so that they may preserve their children from tuberculosis.

14. **From your experience, what are the most predisposing causes of tuberculosis in childhood?**

Summary of answers:

In reality everything that lowers the rate of vitality and resistance. There is first of all congenital weakness due to heredity from parents either tuberculous, alcoholic, syphilitic, or to the parents being too aged. This constitutes hereditary predisposition. Then there is the baleful influence of certain infectious diseases which are more common in early childhood, namely: measles, whooping-cough; the leavings of these two diseases in the respiratory organs predispose children to tuberculosis if they may be at all exposed to infection by milk or by family contagion.

Now, in our province, our population regards these two diseases as almost harmless and necessary evils, and many mothers voluntarily expose their children to them, believing that if they must have them they had better have them at once. This is a serious error which education must correct. Then, comes the fatal influence of impure air in which young children live almost continually; impure air in dwellings generally and still more impure air in bed-rooms that are usually small, crowded and lumbered. At the same time, children are wrongly nourished as is shown by the excessive infantile mortality in our province. Out of 100 children, 50 die in the summer season; as to the others, who have been ill and have not died, they infallibly retain leavings which render them more liable to catch other diseases. As a proof of defective alimentation among our children may be noted the frequency of rickets, practically the most marked are among the Syrians in whom all are ricketty. Bad alimentation engenders troubles of nutrition and defective nutrition engenders a condition of receptivity for the tubercle bacillus. For this reason also, the Syrians are nearly all more or less tuberculized. These troubles of nutrition in the first period of childhood can not fail to have an effect in the second period and on adolescents.

In the second period of childhood, the vitiated air of our schools, long school hours, lack of exercise in pure air, all these added to the still impurer air of the house, constitute the greatest danger for children at that age; a great many children have adenoid tumours or infected tonsils which maintain a general sickly condition very predisposing to tuberculosis.

Adolescence—The most frequent causes of diminished resistance are: for

a certain number of the poor premature work in factories; for the others a confined life, contrary to nature, in boarding-schools, where the air is as much vitiated as in the school, especaily in the dormitories and class-rooms, where the food is not suitable, where recreation hours are spent in a dusty atmosphere, where there is really no systematic physical culture as there should be and as exists among the English. In adolescence there is still another very powerful cause of etiolation, that is, the **premature use of tobacco.** All physicians and teachers notice that young lads who smoke have pale, drawn and enervated faces, that they lose their memory, that their success in class diminishes, that both their physical and their intellectual development is arrested.

15. **Do you know of any cases of tuberculosis ascribable to infected milk and to tuberculous meat?**

A great many physicians reply affirmatively with respect to infection by milk, but no authentic case is given respecting tuberculous infection by meat. This is easily explained. The physician can without difficulty trace infection by milk as the suspected cow can be examined, while he can only suspect contamination by meat, as the animal has already disappeared long before tuberculosis manifests itself in the patient he is called upon to attend. The following are authentic examples of tuberculous infection by milk: "A tuberculous cow was to be slaughtered by order of a veterinary surgeon. Instead of this, the owner sold it to a poor man for a few dollars. In less than six months, the purchaser's child was affected by glandular tuberculosis of the neck." (Dr. de Lancey Johnston, Richmond.) "This summer I noticed a case of tuberculosis in a child which was apparently due to milk" (Dr. E. Gagné.) "I have recorded a case of tuberculosis imputable to infected milk." (Alfred Marcil, Montreal). "I think it happens frequently. I know two families free until then from tuberculosis, two of whose boys died of that disease, having caught it from the cows they looked after. So far these are four victims. After the strictest enquiry the disease cannot be imputable to any other cause than bovine tuberculosis." (Dr. A. Hébert.) "Yes, a personal case in a little girl." (Dr. A. Lesage). "I have observed some cases." (Dr. G. Kennedy). "I know children who have certainly been infected by milk." (Dr. H. Simard) and Drs Groulx, Paquin Thompson, Archambault, Hudon, Daigneau, Gaudreau, and others also assert that they have observed one or more cases of tuberculous infection in children, due to milk.

Although this source of tuberculization does not possess the same importance as human infection, it is all the same advisable to avoid it by the pasteurization of milk.

16. **From your experience, what unhealthy conditions in your city or town are predisposing causes of tuberculosis?**

All physicians are unanimous in mentioning "dust" in answering this question. Montreal physicians especially point out, as a public calamity, the

dust raised by automobiles and tramway cars. running at a very rapid rate. That dust falls, not only on the many foot passengers, but penetrates also into the lower stories of houses. We have proved in the first part of this chapter how dangerous dust is. We have seen that dusty trades are tuberculous trades. It is painful to observe that the crowd of workers returning home between five and seven o'clock in the evening after breathing the vitiated air of offices and factories throughout the day, must continue to breathe a noxious atmosphere in the streets. At that hour of the day thorough watering is urgently needed. Should not the speed of automobiles and tramway cars be also regulated, for, at a slow rate of speed, they present less drawbacks as regards dust. The municipality of Montreal is especially charged by physicians with negligence. Here are some precise charges: Dr. Aumont, in answer to the above question, says: "Uncleanliness of streets and lanes; dampness through lack of drainage in many places; opened sewers; garbage thrown into streets to raise their level; bad smelling ponds left near dwellings all summer; irregularity in the removing of garbage—thus, in St. Ambroise street the scavengers have passed only three times in the space of three years. I could furnish affidavits in connection with this." "In Montreal," says Dr. Leduc, "there are houses in which a breeder would not put his live stock. In those houses there are one or two families living in every room and the rooms are only fifteen feet square. There are lodgings with two or three rooms giving barely 25 feet of floor space and which are inhabited by from fifteen to twenty persons the year round."

"From my experience" says Dr. J. L. D. Masson, "the greatest factor in the spread of tuberculosis is the dreadful condition of the dwellings in which immigrants lodge on their arrival and even afterwards. I have seen the disease spread in several families living in crowded lodgings without air, without light, each room being used by one and even two families. It is manifest that contagion must infallibly exist under such conditions and that the isolation and treatment of the sick are impossible. Those dwellings not only lack air and sunlight, but also drainage. The houses in the central part of the city, occupied chiefly by immigrants, are real hot-beds of contagion." One physician cites as an example of the Corporation's negligence a stable situated quite close to the sidewalk and draining under the latter into Roy street near Lafontaine square. A great many other specific complaints, made by Montreal physicians, might be cited. After dust, uncleanliness of the streets and lanes of certain wards, the overcrowding of houses inhabited by immigrants, the dampness and darkness of a great many lodgings, are the most complained of. Darkness causes man to blanch and fade away as it does plants. — It is due to the narrowness of the streets or the excessive height of the houses, the small size of yards and of certain dwellings called **flats** for which there has been an infatuation for some time past. It is chiefly in those flats that one finds the veritable dark room, the hot-bed of tuberculosis. In these, servants become tuberculized, and when they are sick, they convey contagion from house to house and finally into their own families.

Dampness is a great source of irritation of the respiratory organs, it prolongs the duration of colds, and frequently prevents their being cured. This constitutes a predisposition to tuberculosis. Dampness in lodgings is inveighed against, not only for town houses, but for country houses also. People seem universally ignorant that, with few exceptions ,the soil is nearly always impregnated with dampness and the latter is communicated to the lower story of houses. It may be asserted that, in Montreal, basements and ground-floors are seldom damp-proof.

The situation in Quebec seems to be pretty much the same, since Dr. Paquin says: "Lack of air through houses being huddled together, dust, uncleanliness of dwellings, uncleanliness of streets, lack of watering, lack of ventilation, dry sweeping in houses, want of public parks." And again: "Dust, want of air, through houses being huddled together, narrowness of the streets, absence of public parks among the dense population of St. Roch suburbs." (Dr. Lessard, Quebec). The same for Sherbrooke: "Dust, uncleanliness of certain houses in certain wards, lack of disinfection of houses where there has been tuberculosis." (Dr. Pelletier, Sherbrooke). In Fraserville, contagion seems to be the chief factor, acording to Dr. Gilbert. In Three Rivers, Dr. Panneton chiefly accuses the lack of knowledge of notions of public and private hygiene. In Valleyfield, Dr. Ostigny chiefly blames the premature work of children in factories. In Longueuil Dr. Lesage blames dust, uncleanliness and contamination by expectoration. In St. Hyacinthe, Dr. Beaudry points out defective drainage.

Smoke from factories and locomotives is also blamed by several Montreal physicians. When one surveys Montreal from the country, it is nearly always enveloped in a heavy cloud of smoke. Smoke is hurtful, in the first place, by the disagreable impression it produces and by its effect upon respiration, whence results less oxygenation of the blood. It is moreover irritating and excites or maintains catarrh of the respiratory organs. Smoke also has the effect of greatly diminishing sunlight which has a vivifying action on man and a disinfecting one on the streets and likewise promotes the persistence of atmospheric humidity.

To sum up: There are in the cities of the province, especially in Montreal and Quebec, the following unhealthy factors: **dust, uncleanliness** of streets, lanes and of a great many houses, **lack of air in dwellings** through narrow streets and small yards, through **lack of parks** in wards where the population is dense, overcrowding of dwellings occupied by immigrants, **lack of disinfection** of infected lodgings, **lack of drainage** which makes yards damp, many houses with **dark rooms**; finally, in Montreal, **smoke** from factories.

17. From your experience, what unhealthy conditions explain the frequency of tuberculosis in rural districts?

All the physicians agree in answering: lack of ventilation, lack of sunlight, overcrowding of bed-rooms, ignorance of the infectiousness of the disease, absolute lack of necessary precautions for avoiding contagion.

It is quite certain and curious at the same time that the countryman who possesses in abundance what the city resident so greatly lacks: pure air and sunlight, probably is the one who enjoys them the least. Through want of proper instruction, he does not know that air and sunlight are the basis of life and health. He even takes unheard of precautions against those vivifying agents; his house is like a closed house which does not allow the vitiated air to escape nor pure air to enter; his windows are provided with double, even triple appliances, — windows, blinds and shutters — to prevent the entrance of purifying sunlight. Man unconsciously repairs his errors by his outdoor work during the day; but woman and the children continue to live all the time in a vitiated atmosphere whose effects are felt imperceptibly, but surely. In many parts of the province people do not take the trouble to remove the double windows at the end of the winter. In summer, by closing the blinds or shutters, a damp atmosphere is maintained in the house. In such an atmosphere plants blanch and fade away and so do human beings also.

Another serious error among our country people is the improper manner of heating during winter. Heating is excessive or irregular, and people are exposed to sudden or to great changes of temperature which cause repeated colds. Another error also is that of keeping the best and largest room for the parlor and setting apart the smallest and worst situated for bed-rooms, These rooms are necessarily overcrowded and lumbered up and, as no steps are taken to renew the air, people live for eight consecutive hours in an atmosphere that is breathed over and over again and devitalized. If tuberculosis implants itself in a member of the family, contagion has a chance to spread, because, through ignorance of the bacillary and contagious nature of the disease, none of the necessary precautions are taken. It is manifest that such errors must be overcome by popular instruction in the elements of hygiene.

To sum up: lack of ventilation, lumbering and **crowding of bed-rooms, lack of precaution against family contagion** are the three chief factors constituting the basis of tuberculosis prophylaxis in the country parts.

18. **From your experience, what unhealthy conditions in our local industries are predisposing or determining causes of tuberculosis?**

"My observations in the dispensary of the Montreal Anti-Tuberculosis League, says Dr. Harding, denote an unusual number of patients working in boot and shoe factories, fur factories, cigar factories, and of Jews employed in making garments.

This is in accordance with the experience of all other countries; all dusty trades predispose to tuberculosis in an eminent degree. But the effects of dust may be greatly lessened, if not entirely removed, by proper mechanical ventilation.

Another great danger to be observed in Montreal, is the **overcrowding of workshops.** "I found a case of tuberculosis" says Dr. G. Kennedy "in a workshop where thirty girls were working within a place where there was space for seven to eight only." There are still too many workshops lacking air and

sunlight on account of the height of neighbouring buildings, narrow streets and the huddling together of factories instead of each being surrounded by a sufficient space. **Montreal workmen also suffer a great deal from smoke** which irritates the respiratory organs and communicates an unpleasant smell to the air, thereby lessening freedon of respiration. In many workshops, natural ventilation is insufficient for supplying workmen with the proper quantity of air and the necessary artificial ventilation is lacking.

In Sherbrooke, Dr. Darche charges lack of ventilation and Dr. Pelletier lack of cleanliness, for he says that the premises are never washed, white-washed or disinfected. Dr. Ledoux mentions dust and the non-observance of the prohibition to spit on the floor. Dr. Ostigny of Valleyfield, speaks of dampness and dust in the factories, as well as premature labor of children. At St. Hyacinthe also, according to Dr. Beaudry, too young children are employed. But, everywhere, absolute negligence is found in connection with the health protection of operatives by making the sick ones expectorate in special spittoons. **Thus, through dust, overcrowding and contamination of the floors, there is considerable contagion in workshops and factories,** the proportion being at least from 30 to 40%.

Thus the unhealthy conditions we have chiefly to remove from factory labor are: dust, smoke, lack of ventilation, lack of protection for healthy operatives against contagion.

19. **From your experience, is alcoholism an important factor of tuberculization in our province?**

As the consumption of alcohol is not equal in all parts of the province, the answers vary: some are affirmative, the others negative. But the deduction from all the answers is that **alcoholism is really one of the great predisposing causes of tuberculosis.** Moreover this agrees with what experience has shown in other countries. Careful study of the descendants of alcoholics, as so thoroughly carried on by Dr. Paradis, of St. Thomas de Montmagny, clearly demonstrates that alcoholics transmit physical degeneration to their children. On the other hand, experience proves that alcoholism is the chief cause of straitened circumstances and poverty which entail unhealthy dwellings and insufficient alimentation. Therefore to combat alcoholism is to combat tuberculosis.

20. **In your opinion. what would be the most urgent, the most practical and the most effective measures against alcoholism in our province?**

Very varied answers might have been expected to this question. Prohibition, local option, reduction in the number of licenses, increase in the rate of licenses, the obligation to obtain the assent of electors to applications for licenses, the reduction of the hours during which liquor can be sold, the abolition of treating by law, the adoption of the Norwegian or Gothenbarg system, doing away with selling by the glass, a surtax on alcohol, and admission of wine free of duty, each of these measures has its advocates. **But all agree in acknowledging that the most important measure is to educate the people by**

anti-alcoholic teaching in schools, through the press, from the pulpit, and by leagues. Man must first be taught that he is greatly mistaken when he seeks for strength, heat and food in alcohol; he must then be taught the evil effects of alcohol on the individual, upon his offspring and consequently upon families and upon society.

Then, **all are agreed as to the urgency of reducing the number of taverns by reducing the number of licenses.** Some suggest a gradual reduction so as to avoid financial disturbance. If the public treasury itself is threatened with a disturbing decrease, raising the license might remedy that drawback. A great many liquor sellers are merely the agents of wholesale dealers, thus, it is suggested that, for protection against the latter, the person who wishes to obtain a license, be obliged to secure the signatures, not only of twenty-five electors of the ward, but of the majority. By such means, the electors alone would be masters at home.

A great many physicians are in favour of having the sale supervised either by the State or by respectable associations to which alone the license would be granted, that is to say, the South Carolina system, the Norwegian system or Lord Grey's system.

Prohibitionists are fairly numerous and bring forward proofs in support of their system. Thus, Dr. F. Foss, of Black Lake, Megantic County, writes: "Our town is prohibitionist, and it is undeniable that prohibition is a good thing for the poorer classes. Of course alcohol is still sold, but infinitely less than if there were licenses. Likewise, hundreds of individuals who would always be drinking under the license system can only rarely do so under the present system. To me it has always seemed preferable that alcohol should be sold by persons employed by the town; in the first place more discretion would be used in the sale of alcohol and then profits from such sales might be used for good works." Another, Dr. J. A. Ross, says: "We have prohibition in our place, and it is certainly the most effective means." Dr. Grenier, of Ste Agathe des Monts, states that prohibition is easily established under section 13 of chapter 5 of title 4th. of the Revised Statutes of the Province of Quebec and that it has excellent results. Lord Grey's system of Trust Houses has also had excellent results and is less strict than prohibition. It is the Gothenborg system without the monopoly, the license being granted to an association of citizens who sell the liquor through an honest employee. Some physicians suggest that the sale of alcohol be exclusively limited to liquor sellers and be taken away from groceries, because **groceries are, in too many instances, taverns for women,** because such competition leads to the sale of more and inferior alcohol and finally because the ease with which produce such as eggs, grain, butter, etc., can be exchanged for liquor in stores, induces farmers to drink.

Several physicians denounce the sale of liquor by the glass and the treating habit and ask it to be prohibited by a special law. One physician mentions the fact that the anti-treating law in the State of Indiana has had the effect of lessening the consumption of alcohol more effectively than any other legislation.

All agree in asking that the hours during which liquor may be sold be regulated so as to remove from the working classes inducement to drink.

All agree also as to the necessity of State supervision of the quality of alcohol, for if pure alcohol is already a dangerous substance in itself, inferior alcohol is still more so, owing to the toxic substances it contains. Experience proves that the rich and well-to-do classes suffer less from alcohol than the poorer classes owing to the difference in quality. It is the duty of the public authorities to protect the poorer classes against poisoners.

Finally some physicians suggest that very severe penalties be inflicted by the authorities upon those who do not respect the law and who sell liquor to minors and to adults already intoxicated. They recommend that they be punished by taking away their licenses for the second offence.

CONCLUSIONS OF THE ENQUIRY

This enquiry carried on by means of a medical referendum, that is to say, among those who are in a better position to be familiar with the subject under consideration, has revealed the following positive facts:

1. Official statistics inform us only of the minimum extent of the disease, for they give only the duly recorded deaths and not the number of all who suffer more or less from it. But, even if we consider only the number of deaths, we have reason to be anxious, for it represents too large a number of losses of life that might have been avoided. If we were to see a city such as Three Rivers, for instance, with its population of 20,000, disappear in a decade, the entire population of the province would be horrified by such a calamity. As a matter of fact tuberculosis has taken from us 33,190 lives in a decade.

2. Our women die in greater numbers, contrary to what happens in other countries. Why? Because our women do not pay attention to following the rules of hygiene in domestic life: because, especially, they do not take proper precautions before and after confinement; because before becoming mothers, a too great number of our girls are etiolated or withered from work in factories.

3. Mortality is greater among French-Canadians than among English-Canadians, because they are more exposed to industrial labor and other fatiguing work; because they live in more or less unhealthy, crowded buildings; because they are more ignorant of and observe in a lesser degree general hygiene; because the idea that tuberculosis is hereditary is still ingrained in them and they do not take the necessary precautions against contagion.

4. Immigration, which has assumed greater proportions during the past few years, throws, into the metropolis especially, thousands of people, who, owing to their slight means, lodge in any kind of a house, with one or two families in a room; live in disgusting uncleanliness, and by nourishing morbid germs, contribute also to make their quarters real hot-beds of the disease. Most of those immigrants are nomadic, frequently moving from house to

house, ward to ward, city to city, therefore spreading the contagion and rendering their cognizance by the health authorities very difficult. Moreover, being ignorant of our health regulations and laws, they frequently infringe them and are a bad example to the population who are already difficult to educate in this matter. The law which allows of their being deported within two years of their arrival if they become tuberculous, is of delusive efficiency because the health authorities are not sufficiently equipped to exercise adequate supervision.

5. Contagion plays the principal part among causes of tuberculization in our families, both in the country and in town. It has ample opportunities, for people generally are ignorant of the infectious nature of the disease. Unhealthy dwellings come next.

6. The unhealthy conditions found in our dwellings both in the country and in town are in order of their importance, lack of ventilation, lack of sunlight, overcrowding of bedrooms, dampness and faulty heating.

7. There are also many lodgings infected by consumptives which, through lack of disinfection, convey the disease to healthy people.

8. In all places where people are gathered together such as workshops, offices, factories, schools, colleges, convents, asylums, prisons, etc., the danger of tuberculous contagion exists owing to the lack of precaution against it, due to the ignorance of the contagious nature of tuberculosis or the negligence of employers or the heads of public offices or great companies.

9. A great many teachers of both sexes, especially among the religious orders, are tuberculous, and a danger to their pupils.

10. The pupils in elementary schools are attacked more by glandular tuberculosis and tuberculosis of the bones and contagion from pupil to pupil is rather limited. Nevertheless some pupils have open tuberculosis and a single one may contaminate many.

11. The majority of the schools in the province do not give each pupil 150 cubic feet of air space and this figure is a barely acceptable minimum. Americans exact more: 200 feet at least and recommend 250. Thus, our schools are overcrowded.

12. The majority of the schools in the province have no appliances for ventilation. Ventilation is provided solely by windows and does not count in winter, since the windows are continually and hermetically closed. The chief defect in our schools is lack of ventilation.

13. Tuberculosis among our children is chiefly due to family contagion and to a slight extent to infection by milk.

14. The chief predisposing causes of tuberculosis in children are living continually in vitiated air at home or at school; faulty feeding during the first months, which produce rickets and general debilitation; lack of proper attention after infectious diseases, especially measles and whooping cough; the presence in a great many of infected tonsils and adenoid tumours.

15. Our milch cows are tuberculous in the proportion of about 10% and the infection of the child by milk is duly established by physicians.

16. Our cities do not present the same degree nor the same elements of unhealthiness. Among all, Montreal is the most unhealthy, owing to the atmosphere always full of dust raised by automobiles and tramway cars, of smoke from the chimneys of its numerous factories; to its many unhealthy dwellings; to its considerable population of immigrants who huddle together in dirty, infected and damp lodgings and in quarters that are unhealthy by their age; the crowding of houses together and narrow streets. In other cities that element of unhealthiness, immigration, does not exist.

17. The chief cause of tuberculosis in the country is family contagion due to ignorance of the contagious nature of the disease. The consequence of such ignorance is that people take no precautions against the infection, they expectorate on the ground or floor, infect their dwellings and do not isolate their sick, live in immediate contact with them, their children sharing the same room and even the same bed with them. Girls who have left home to go and work in the cities either as servants or in factories come back with the disease and spread contagion. Moreover, there are very powerful predisposing causes in our country people's manner of living; they live continually in an atmosphere vitiated through non-renewal of air, they shut their windows to the sunlight, make their bed-rooms too small and overcrowd them.

18. In industry, the law does not as yet contain any provision respecting operatives in an advanced stage of tuberculosis and there is no medical inspection of industrial establishments. Now, there is contagion between people working together. The law requires that spittoons be placed in workshops, but a great many employers are ignorant of such necessity and even of the law. Mechanical ventilation, so necessary in certain trades producing metallic, mineral, vegetable or organic dust, is lacking in a great many factories. Means of securing personal cleanliness among operatives are also lacking in several factories. The protective laws are perhaps sufficient, but the staff of inspectors and supervisors is not numerous enough and, above all, there is a lack of competent medical men, expert in hygiene, for hitherto **more thought has been devoted to the prevention of accidents than to the prevention of diseases from industrial centres.** In all our cities where there are factories, there is one great cause of the etiolation of youth predisposing to tuberculosis, and that is premature or excessive labor.

19. Alcoholism with its consequences: degeneration of the individual and of his progeny; straitened circumstances or poverty — exists more in certain parts of our province than in others. Nevertheless, it does not play an immoderate and almost preponderant part here as in France. It certainly has however, its share of responsibility in causing tuberculosis in our Province.

CHAPTER III.

Prophylaxis

Practical means for combatting Tuberculosis

Infection and all the influences which depress the forces of the organism below a certain limit are the two great facts clearly brought to light by the study of the causes and which govern the pathogeny of tuberculosis. Therefore, if we wish to surround the enemy on all sides, we must attack everything which to a greater or less degree favors the spread of infection and causes weakening of the organism. The sowing of the seed and the preparation of the soil must be prevented. The measures to be taken against the disease may be divided into individual and public measures.

As the individual is the first to suffer from this terrible disease, he is the most interested in protecting himself by practice of proper hygiene whose elements should be taught first of all at school, and in other educational institutions, and afterwards by the family physician, by lectures, etc. But, as the disease finds some of its main sources in social life, it is the duty of society to take the proper measures for preventing invasion by this social plague. The mission assigned to the Royal Tuberculosis Commission consists merely in studying the general course of tuberculosis in the Province of Quebec, and suggesting the most urgent and most practical measures for its arrest to the public authorities.

The study of the causes of tuberculization in the province has shown us that we have to contend against: 1. contagion in the family and in the collective life of offices, workshops, factories, schools, and all other places where people are gathered together; by infected dwellings; by the milk and meat of tuberculous animals and by dust; 2. the weakening of the normal resistance of the organism by dark, damp, dirty, crowded and unventilated dwellings; by atmosphere loaded with dust and smoke; by the anti-hygienic conditions of labour; by alcoholism. Such is the list of preponderant and social causes.

(a) AGAINST INFECTION

The following measures are requisite if all the sources of infection in social life are to be guarded against:—

I. **The compulsory notification** of cases of tuberculosis, similar to that demanded for other infectious diseases, so that the health authorities may know the foci of infection and proceed to render them harmless.

II. **Education of the people** as to the methods of preventing the spread of the infectious germs during the progress of the disease so far as circumstances will permit.

III. **Disinfection of contaminated premises,** if possible, during the course of the disease, and as a matter of course after the death of a patient or his removal to other premises.

IV. **Prohibition of expectoration** on sidewalks and in public conveyances and buildings, with provision of spittoons containing lye in the latter.

V. **Inspection of dairy-houses** and slaughter houses.

V. **Prevention of dust** by all possible means in city streets where there is the most vehicular traffic and in various trades.

VII. The establishment of **anti-tuberculosis dispensaries,** through which, as all cases of chronic or continued lung disease are attracted, a multitude of cases of tuberculosis are brought to light, and through which, as the patients are visited at their own homes, yet other cases are disclosed.

VIII. The provision of **Isolation Hospitals** or special pavilions in association with existing hospitals for the segregation of poverty-stricken patients, these through overcrowding and lack of means being the main sources of infection.

After studying all these essential points in connection with the campaign against infection, the Commission submit the following recommendations.

1. — Compulsory Notification of Tuberculosis

The Commissioners are not unaware of the fact that there is a law in our Province ordaining that physicians declare all cases of tuberculosis to the health authorities, but they have ascertained that the law remains a dead letter; they regret that it is not enforced, because, **in order to combat a disease, it is necessary to know where it exists.** Moreover, the knowledge of all cases of tuberculosis, as of all other diseases, alone permits of the drawing up of the accurate statistics of morbidity, required for the application of proper prophylactic measures. It must not be imagined that, in enacting this law, we are ahead of most other countries, for it already exists elsewhere. In New York, for instance, it has enabled a campaign against tuberculosis to be organized which is considered a model one and has materially helped to bring about a reduction of 44% in the mortality from tuberculosis, notwithstanding the disadvantageous conditions due to the cosmopolitanism and density of the population of that great American city. The compulsory notification of tuberculosis was deemed so important by the Tuberculosis Commission of the State of Maryland that they recommended the authorities to pay $1.50 for every case of tuberculosis declared.

In any case the Royal Commission recommend **that the Board of Health of the Province of Quebec send a circular once a year to physicians calling their attention to the existence of the law and to the importance of carrying it out. Also that a circular be sent every year to the parish priests by the Board**

of Health recommending them to read out the circular in church so as to enlighten the people as to the necessity and duty devolving upon heads of families in making the notification.

2. — The Gratuitous Examination of Patients' Sputa

The Commission recommend that patients' sputa be examined free of charge, at the Laboratory of the Provincial Board of Health or in existing municipal laboratories on the sole condition that the name and patient's address be known. The physicians of the laboratory where the examination is made will with their report send the text of the law bearing upon compulsory notification.

By such means, the health authorities will find out a great many consumptives whom they would otherwise never have known, and when known, the nurses employed by or with the support of the municipal board of health will, if circumstances seem to demand, visit the patient and offer instructions regarding the necessary precautions to be taken by the family and associates of the patient.

3. — The Prohibition against Expectoration

This already exists in the statute book as regards sidewalks and public buildings. The Commission wish this law to apply also to all portions of apartment houses used in common by all the residents of such houses, such as corridors, passages, stairways.

As stated in the second chapter, a single sputum of a tuberculous person may contain millions of bacilli, so that it is easy to realize the advisability of such a law.

It may perhaps be found inconsistent to forbid to spit on the sidewalk and not on the road-way. But the road way is watered and cleaned every day, the bacilli deposited on it are carried off in the drains; the sidewalks are never washed nor cleaned by the municipality, the bacilli deposited there remain longer, become mixed with the dust, adhere to the soles of shoes and skirts of dresses and are thus conveyed into houses where they find favorable conditions for their preservation and are raised up by sweeping. It may be perhaps contended that sidewalks are disinfected by sunlight, but it must also be borne in mind that owing to the unscientific laying out of the streets, a great many of them get no sunlight, or very little.

4. — Provision of Spittoons in Public Buildings

This recommendation is but a corollary of the foregoing one. Sometimes people are obliged to expectorate, and if they are forbidden to expectorate on the floors of the public buildings, it is right that the public should have at its disposal what is needed for not soiling the floor.

There should be a sufficient number of spittoons, placed where they can be easily seen, of sufficient size, and containing some antiseptic liquid, preferably a 10% solution of carbonate of soda. To those who find the spittoon a

repulsive object, it may be said that there are some which serve as a stand for a bunch of flowers and are rather ornamental.

5. — Disinfection of Infected Rooms or Lodgings

Room and house infection is well proved and happens too frequently for people to not believe it, as demonstrated in the second chapter. The Commission therefore recommend:

1. **That municipalities carefully enforce regulations 25a and 25b which read as follows:**

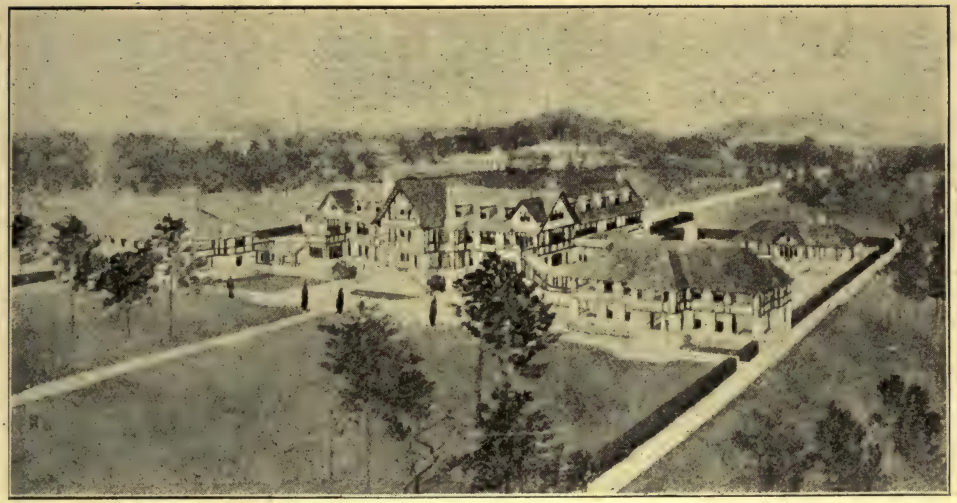
25b. Any householder in whose household a death from pulmonary tuberculosis has occurred shall, within forty-eight hours from said death, notify the secretary-treasurer or the local board of health of the municipality in which the house is situated, and upon such notification the municipality shall cause to be disinfected the apartments which it will deem to have been contaminated by the patient. Unless more precise and reliable indication be given, will be considered contaminated the rooms the patient has occupied during his illness. (By-laws).

25b. Whenever a person suffering from TUBERCULOSIS which has reached the stage of suppuration and expectoration (open tuberculosis) changes his residence, the householder of the premises which such person vacates shall notify the municipal sanitary authority previous to the projected removal, and after the departure of the patient the said municipal sanitary authority shall have the disinfection done of all apartments which it will consider as having been contaminated by the patient. (By-laws).

2. The Commission further recommend **that no lodging that has become infected and vacant be occupied by fresh tenants without a permit from the health authorities.**

6. — Anti-Tuberculosis Dispensaries and Isolation Hospitals

The dispensary is one of the best means of family and social prophylaxis. Owing to the attraction of gratuitous treatment for all diseases of the respiratory organs, patients in all stages of the disease go to the dispensary. There all incipient or advanced cases are recognized; incipient cases which are not contagious yet, as well as the contagious. The latter receive special instructions to prevent their spreading the murderous bacillus around them. A nurse visits the house of such patients and corrects grave errors against hygiene; if she finds other members of the family looking ill, she gives them advice and urges them to go to the dispensary for treatment; thus a great many cases are traced out in time to be saved. In the dispensary also, the patients who should be sent to a hospital are picked out. The dispensary is in connection with benevolent societies and notifies them what poor families need assistance of any kind. It further constitutes one of the best means of popular education, not only through the physician's instructions to the sick and the nurse's advice to the members of the family, but also through printed instructions and information. **The dispensary is thus a means of treatment, of prophylaxis, and of**



LAURENTIAN SANATORIUM, STE-AGATHE DES MONTS, P.Q.

popular education It is the most important weapon of the anti-tuberculosis armament. **The Commission therefore recommend the Government to aid, in a very special manner, the dispensary with the isolation hospital, which is its complement.**

But they recommend that pecuniary aid be granted only to corporations properly organized by letters patent and offering guarantees as to proper working; preferably, therefore, to well established anti-tuberculosis leagues. Such dispensaries should be established in quarters where the working classes live and their number should be in proportion to the population of the town. Dr. Phillip, of Edinburgh, recommends a dispensary for every 20,000 of population.

It must not be imagined that such institutions are costly. Thus, for instance, the Roux Dispensary in Lille aided 120 patients a day, in March 1903; washed the linen of 55 patients per week and yet the expenses did not exceed 30,000 francs ($6,000) per annum.

The building and maintenance of a single sanatorium costs more than that of several dispensaries, and while the former deals with only a very limited number of patients, the latter have a very much more extended and popular activity. Germany, which, at first, was so greatly taken with the sanatorium that it erected 85, has recently realized the importance of the dispensary and has at present 763 in the whole empire. This does not mean that the sanatorium is not worthy of consideration, from the public authorities. Far from it. But, as it plays a less effective part than the dispensaries, it may be said that ten dispensaries are needed for one sanatorium.

Isolation Hospitals.

Isolation hospitals and special wards for the segregation of open and infectious cases of the disease **are of preponderant importance.** It is evident from the data afforded in the previous section that before everything it is important and indeed urgent that the essential agents in the spread of the bacilli, namely, advanced cases expectorating abundant bacilli be so placed that they cannot infect those around them. It is the advanced case in the poor family that is the main source of the disease. **The Commission recommend that before preparing to build, or to contribute to the building of special isolation hospitals, existing institutions be approached and the endeavour be made to gain their co-operation, subsidies being offered both by the Government and the municipalities,** in the first place in aid of the necessary buildings, and in the second towards the maintenance of the patients at so much per capita per week. Your Commission are of opinion that it is more practical as well as more economical to employ the services of existing institutions and of their staffs than to establish separate institutions with separate grounds and premises and separate staffs.

7. — Control of the Milk Trade

Infection by milk exists. Although it plays a less important part than human contagion, it is nevertheless not negligible. At the last Tuberculosis Congress held in Washington, the consensus of opinion was that it was necessary to continue taking precautionary measures against tuberculosis from bovine sources, inasmuch as the spread of tuberculosis by the bovidae to man is acknowledged to be possible. In chapter II, section B, we related some of the facts ascertained by physicians of the Province of Quebec.

Even if the proportion of cases of tuberculosis due to the milk and meat of tuberculous animals be small compared to that due to infection from man to man, the fact has to be kept in mind that little children fed as they are upon cow's milk are susceptible to infection and that **individuals first infected by milk or meat become secondarily a fruitful source of human infection and spread of tuberculosis.**

Basing its opinion on all these facts, the Commission hold that the strictest supervision should be exercised over the source of supply of milk as well as over the milk trade and, in connection with this, they make the following recommendations:

1. **That every milkman should be authorized to sell under a license from the municipality where the milk is sold.**

2. **That all dairy establishments and those where milk is sold should be inspected by veterinary surgeons or by inspectors who should obtain a certificate of competency from some institution recognized by the Board of Health of the Province of Quebec.**

3. **That laws be enacted to secure proper hygienic conditions in stables; such conditions to be seen by the inspectors.**

4. **That milch cows be tested by the tuberculin test performed by veterinarians accredited by the Provincial Board of Health.** Those that react being rejected, the sale of their milk being forbidden, and that in cases of dispute the decision shall lie with the chief veterinary inspector of the province.

5. **That skimmed milk and whey from cheese factories, butter factories and creameries, intended for feeding swine, calves and other live stock, shall not leave such factories or creameries without having been sterilized.** (That swine are peculiarly liable to contract tuberculosis from feeding on skimmed milk and whey from infected cattle is pointed out in chapter 2).

6. That the municipalities of the Province be empowered to make the necessary regulations for carrying out these recommendations and that in the event of a municipality not availing itself of these powers the Board of Health of the Province be given the right to promulgate and enforce the necessary regulations within the limits of that municipality.

8. — Control of Butcher's Meat

From calculations made by experts the proportion of tuberculosis among the cattle of this province may be estimated at or under 10%. Many of these cows find their way in the end to private or public slaughter houses. Swine

are still more susceptible to tuberculosis than are cows. Thorough cooking of the meat prevents infection, but, as a rule, meat is not thoroughly cooked and hence some danger exists. Moreover, dealers use meat of inferior quality and sell it as canned meat, sausages, etc. The Commission are of opinion, that a control should be exercised over the sale of butcher's meat and to that end, they recommend:

1. **That in every municipality, with a population of 5,000 or over, a public abattoir or abattoirs be established, such abattoirs to be under the control of competent inspectors who shall supervise the carrying out of the provincial and municipal regulations.**

2. **The municipality possessing public abattoirs shall furnish an annual report to the Provincial Board of Health** stating the number and kinds of animals slaughtered, the number rejected and the nature of the disease of the rejected animals.

9.—Extirpation of Bovine Tuberculosis

The Commission are of opinion that in addition to the foregoing measures which are only protective against the disease, **measures should also be taken to extirpate the disease** gradually and, to that end, they suggest the following measures:

1. The **free distribution of tuberculin** to be applied by a competent veterinary surgeon for the purpose of finding out sick animals and separating them from the herd or of preventing the introduction of sick animals into healthy herds.

2. The **organization of a campaign** for anti-tuberculosis education among farmers.

3. The **appointment of a provincial veterinary surgeon** as chief veterinary inspector who would be attached to the department of agriculture and whose duty would consist in distributing tuberculin, controlling its application and giving advice to municipal inspectors and farmers.

(b) AGAINST PREDISPOSING CAUSES

If the presence of a specific bacillus is needed for producing tuberculosis, the predisposing causes play a very important though indirect part. Now modern social life imposes many anti-hygienic conditions on man which gradually and often rapidly undermine his powers of resistance.

In childhood a school with bad ventilation and poor air may have serious depressing effects. When barely adolescent, he is condemned to excessive labour in factories. The adult may spend a greater part of his life in unhygienic conditions of work and equally unhygienic home conditions.

The atmosphere of large cities has become exceedingly hurtful through dust and smoke; alcoholism facilitated by the great number of places where liquors are sold and by the bad quality of the alcohol, causes considerable and alarming ravages among the working classes. These are the predisposing and preponderant causes which it is urgent to control.

1. — Unhealthy Dwellings

In the second chapter, we showed the preponderant part played by the unhealthy home in the wasting away of man. The causes of unhealthiness of houses with respect to tuberculosis are: darkness, want of ventilation, overcrowding, dampness, infection of the lodgings and uncleanliness and negligence on the part of the tenants. To combat these anti-hygienic conditions in the dwellings, the Commission make the following recommendations:

(a). — Against Darkness

Darkness is due to the defective laying out and the narrowness of the streets, the excessive height of the houses in proportion to the width of the street, the small size of yards, the huddling of houses together, the absence of windows, the obstruction of the latter, with opaque curtains, with blinds and shutters.

The Commission recommend:

1. **That, in future, city municipalities shall determine beforehand the laying out of the streets and their width so that sunlight may be evenly distributed on both sides.**

2. **That the width of the street be at least equal to the height of the houses lining them and preferably that they exceed it by one third, so that sunlight may be evenly distributed through all the storeys.**

3. **That city municipalities shall determine the sections in which alone factories and other large buildings can be erected.**

4. **That they shall likewise determine the area of the lots that may be covered by buildings and that a free space be left both in front and in rear of the buildings.**

5. **That a law be passed to compel a town with a population of 5,000 or over to have a plan drawn up beforehand for the extension of the town limits.**

6. **That no private house or building where people are gathered together shall be built in future without a permit from the health authorities after an inspection of the lot and of the building plans, (such a law is the only way of preventing dark rooms which are so unhealthy).**

7. **That no private house or building where people are gathered together be occupied after its construction until an occupation permit has been given by the health authorities.**

(b). — Against lack of air

One of the great causes of tuberculosis is lack of air and of ventilation. This depends upon the narrowness of streets, the small size of yards, the excessive height of buildings, the huddling of houses together and also the negligence or ignorance of the people in preventing air from entering the building by constantly keeping the windows closed.

The Commission recommend:

1. That in addition to the foregoing means which facilitate the distribution of sunlight, the entrance of light, and the circulation of air, **cities should**

make regulations to prevent the existence of streets without outlets and yards having no direct communication with a street or lane.

2. **That public parks and playgrounds for children be multiplied.**

3. **That there be a periodical inspection made, preferably by a physician, of the ventilation and other hygienic conditions of all buildings where people are gathered together,** (schools, offices, stores, factories, workshops), and that every means be taken to educate the people as to the unavoidable necessity of pure air and sunlight in all dwellings and in all the rooms of dwellings. The teaching of the elements of hygiene is certainly one of the best means of educating people on this point.

(c) — Against Overcrowding

When a room can conveniently contain one person or two at the most and it is occupied by a family, there is overcrowding and the two most serious consequences of overcrowding are the lessening of the supply of air for each inmate and the favouring of contagion.

The Commission recommend **that regulations 43b and 43c of our Health Laws be enforced by municipalities.**

43b. Every house owner is forbidden to lease the same lodging to more than one family, unless the cubic space of all the rooms of such lodging, taken collectively, be sufficient to allow each eventual occupant at least (300^3) three hundred cubic feet of space and the floor space be (32^2) thirty-two square feet for each occupant. In calculating the three hundred feet above described, account shall not be taken of the cubic space of rooms having no windows. (By-laws).

43c. Every tenant is forbidden to sublet a portion of his lodging, unless the cubic space of all the rooms be sufficient to allow each eventual occupant of the lodging at least (300^3) three hundred cubic feet of space and the floor space be (32^2) thirty-two square feet for each occupant. In calculating the three hundred feet above prescribed, account shall not be taken of the cubic space of rooms having no windows. (By-laws).

But other regulations are necessary and should be enacted.

(d). — Against Dampness

Dampness favours the life of microbes and brings on congestion, irritation and catarrhal condition of the respiratory organs which predispose to tuberculosis.

The Commission recommend:

1. **That municipalities have the soil of the streets drained and compel proprietors to drain that of yards.**

2. That municipalities enforce the two following regulations:

43k. **Every person who builds a house in future shall, if the soil be damp, insert in the foundation walls and throughout the entire width of such walls an impermeable damp course** without a break.

431. **It is forbidden to lease or inhabit a newly built house before the plaster is sufficiently dry** to the satisfaction of the municipal health authorities and before the drainage plans are fully carried out.

(e). — Against Infected Lodgings

It is well established that a lodging once infected by a consumptive, may afterwards transmit tuberculosis to successive occupants and that this occurs oftener than is generally believed. The Commission recommend:

1. That municipalities strictly enforce regulations 25A and 25B already quoted in section A.

2. **That no infected lodging that has become vacant shall be inhabited by fresh tenants without a permit** from the health authorities.

3. **That all public buildings be kept constantly provided with spittoons,** kept where they can easily be seen, in sufficient number, of suitable size and containing some antiseptic liquid.

4. That sweeping or dusting be always done with a damp broom or duster or by mechanical suction.

(f). — Against Uncleanliness

Uncleanliness is eminently favourable to the life and multiplication of microbes. It also contributes to make the air impure. Now, pureness of the air one breathes is one of the preponderant necessities in hygiene. They who continually breathe impure air soon waste away and lack resistance.

The Commission recommend:

1. **That municipalities give the example of scrupulous cleanliness in streets and public places and so care for lanes and yards as to be an example to the people.**

2. **That they take effective measures against street dust which settles on foot passengers and in the lower storeys of houses bordering on streets, thereby infecting them.**

3. **That they compel the adoption of mechanical protection against dust in industrial establishments.**

4. **That they take effective measures against smoke from factories.**

(g). — Against Ignorance

A healthy house may be transformed into an unhealthy one by the inmates who, through ignorance or negligence, oppose every obstacle to the entrance of air and sunlight, and again by lack of cleanliness.

The Commission recommend that **the teaching of hygiene in schools be made compulsory.**

FURTHER RECOMMENDATIONS
I.—AGAINST UNHEALTHY DWELLINGS

The Commission also would call attention to the need for further enactment against unhealthy dwellings. They would recommend the following based upon legislation effected in other countries:

1. **There is need for an enactment permitting the expropriation of unsanitary properties.** Following the recommendations of Mr. Talamon of the Health Bureau of Paris a law should be enacted (1) permitting unsanitary cottage and house property to be expropriated by the municipality, on payment to the owners of the estimated value of that property were it in sound and sanitary condition, minus the sum necessary to convert it into a healthy and habitable state, and (2) empowering the municipal authorities to construct healthy dwellings capable of being rented at a reasonably low rate either upon the ground occupied by expropriated dwellings or in the near neighborhood of the same. (The object of this last clause is to prevent the demolition of one "slum" leading to the establishment of another, and to ensure that families driven out of condemned property be provided with improved habitations in the same district).

2. **In all cities of 10,000 inhabitants and over it is advisable that there be established "casiers sanitaires de maisons"** or record offices of the sanitary state of the household property of those cities. There should be established an index giving data regarding the sanitary conditions of each separate habitation, drainage, water-supply, nuisances of any order, number of cases of infectious diseases and of deaths notified in any year as occurring at that address; record of disinfections practised. This system is in vogue in Paris and other French cities and furnishes a most available mass of data, not only as regards the hygienic conditions of the different quarters of the city but also directs attention to particular foci of tuberculosis and other infections. It is the best indication of the seat of any particular trouble and of its extent.

3. **The health placard.** Much is to be said in favour of granting upon application an official certificate in the form of a placard to those owners whose house property has fulfilled all the conditions regarding sanitation as are laid down by the provincial and municipal regulations. Such certificate or placard should be valid for one year. The institution of these certificates would, in the opinion of your Commission, materially improve the sanitary state of the cities. It would be to the interest of the owner to produce the certificate before possible tenants: its non-production would distinctly lower the letting value and would necessitate the property being placed in such order as to gain the official recommendation.

4. Legislation is necessary along the lines of the recent British enactments, which will facilitate the building of approved and thoroughly healthy **dwellings for artisans** at a moderate rental.

5. Legislation is also necessary in the near future in our larger cities providing for **cheap and convenient conveyance from the suburbs to the industrial districts,** whereby, artisans may be encouraged to procure dwellings,

both healthy and inexpensive, outside the overcrowded central districts where rents are high and conditions of life unfavorable, more particularly unfavorable for the children.

2.—AGAINST ALCOHOLISM

Alcoholism entails physical ruin of the individual and degenerescence of his descendants and gradually but surely drags the family down to unhealthy dwellings, to straitened circumstances, to poverty and to misery. Earnest efforts should therefore be directed against this indirect factor of tuberculosis. After studying all the means hitherto taken against alcoholism, the Commission have come to the conclusion that there are no perfect means, that all systems have a certain amount of success to their credit, but that such success is closely bound up with the individual mentality of the people of each country.

Prohibition has earnest advocates in some parts of the United States. After thirty years experience of it, in Maine, the Governor of that State could say: "This measure was adopted here in 1851 and now it meets with no organized opposition in the State. After an experience of its working for over a quarter of a century, both political parties admit its beneficial character. The quantity of liquor smuggled into the State and sold secretly is much smaller than in previous years. The law works as easily as any other criminal law. I do not think the people of Maine would wish to return, at any price to the patent law." (Signed) Sheldon Connor, Governor of the State of Maine.

Governor Peck of Vermont and judge of the Supreme Court, fully confirms the foregoing. He says: "I think the influence of the law has been salutary not only in lessening drunkeness and consequent disorder, but also crime generally. The habits of a people cannot be reformed at once. The law has a modifying effect on our habits and has put a stop to treating. I think the law has opened people's eyes and that more persons are in favour of it now than when it was adopted. In fact opposition is disappearing. The aim of all the amendments to the law is to strengthen it. During a career of ten years as a judge, I do not remember seeing a drunken man."

A great many of our physicians consulted by the medical referendum, declared in favour of prohibition. But it must be admitted that this system requires a sacrifice of personal freedom and also requires popular discipline. Another system which respects human freedom and has certainly had excellent results, is the Gothenborg system. Some years ago Sweden and **Norway,** were the two countries most addicted to alcohol, now they are the least so owing to the Gothenborg system. Dr. Bertillon, the celebrated French statistician, says: "The only measure that has triumphed over alcoholism is the Norwegian system. Through it, that country, which was as alcoholic as its neighbour Denmark, has become the smallest consumer in Europe." A great advantage of this system is the creation of funds for philanthropic purposes, the assistance given to consumptives and their families. If objection be made

to the new monopoly granted to certain associations of citizens for the sale of alcohol, then the system proposed by Lord Grey may be substituted for it.

Lord Grey's system, known as the "Public Houses' Trust" is the Gothenborg system, minus the local monopoly, which is one of the conditions of the latter system. As a matter of profit, it is to the advantage of the ordinary saloon to retail as much liquor as possible and as cheap, and, therefore, bad liquor as possible, in order to reap the greatest profit. The ordinary system works therefore to the detriment of the people. By Lord Grey's system a certain number of the saloons in a district are bought by a Trust, and in the saloons belonging to that Trust only liquor of approved quality is sold, and everything is done to promote the consumption of soft drinks. Licenses are granted by preference to Associations of citizens upholding the Trust. The managers of establishments belonging to the Trust are men of tried honesty, who are paid a fixed salary, discourage the sale of alcoholic liquor, and who, in addition, receive a percentage on the non-alcoholic liquors sold.

The success of these established Public Houses' Trusts in many parts of England has been so real and so great that two American economists, Rowntree and Sherwell, have been led to declare that if the system of Public Houses Trusts had existed, as in England, for thirty years, we should by now have no talk about alcoholism in that country. This system has had excellent results in one or two municipalities. By the powers they already possess municipalities can introduce this system: that is, it is in their power to grant licenses to whomsover they choose: all that is necessary to promote the adoption of Lord Grey's system is to start it.

The Commission do not deem it their duty to recommend any system exclusively but think it advisable to study and make the merits of each one known. If, for one reason or another, such systems are inapplicable among us, **the Commission are of opinion that it is urgent to combat alcoholism by:**

1. **Gradual reduction,** that is, year by year, of the number of places where liquor is sold.
2. **Supervision of liquor sold.**
3. **The encouragement of real coffee houses,** that is, of places where non-alcoholic liquors or those containing less than 4% of alcohol would be sold.
4. **Encouragement of anti-alcoholic leagues** in their work of educating the people by lectures, printed matter and posters.
5. **The encouragement of associations for physical exercises** because they are a safeguard and an excellent means of educating young men with regard to the use of alcohol and tobacco. It is a fact well known to the sporting world that alcohol and tobacco are two great foes of strength and perfect health.
6. **Anti-alcoholic education at schools and in factories.**

3.—On Industrial Labour.

It has been shown that tuberculosis obtains the greatest number of victims between the ages of twenty and thirty, at the period, that is, of greatest industrial capacity and of greatest value of the individual as a worker

in the community. Industrial labour as distinct from agricultural, exposes the individual, (1), to the unhealthy conditions of workshop or factory, (2) to special dangers from dust, smoke, certain gases, contact with certain poisonous substances, high temperature, etc., (3) the liability to overwork, from premature labour as a child, or too long continuance at work as an adult.

Workmen as a body are careless, if not ignorant, regarding the anti-hygienic conditions of their surroundings. Even if it were otherwise, they could not of themselves alter this. It is to the employers rather than to the workmen that we must look for improvement, and not all employers realize the value of hygienic conditions, or are willing to introduce improvements unless the public authorities intervene. Furthermore, factories and workshops are situated in cities and in the most crowded portions of the same, so that too often they lack air and sunlight. All are not provided with proper lavatories, thus not inducing their workers to practise cleanliness. Dusty trades, especially, call for a scrupulous cleanliness and a system of mechanical ventilation to keep the dust away from the respiratory organs. These **dusty trades require special attention on the part of public authorities, since, as already shown, they furnish the highest mortality from tuberculosis.** The average age at which workmen die of phthisis is thirty-seven: the average age of death of the general population from all other causes is fifty-two. Could we, therefore, do away with tuberculous infection among workmen, we would add fifteen years to their productive capacity. Even if we take the lowest economic value at each year of life, by preventing tuberculosis, millions of dollars would be saved to the community. **Purely from an economic view, no effort should be spared to prevent the enormous loss of life among all unhealthy industries.** But moreover, not only is the workshop unhealthy, not only are there particularly dangerous trades, but there is further excessive labour causing overwork and the latter is a very powerful cause of denutrition and tuberculization.

With regard to overwork, we here have to take into consideration the subjects of child labour, of women labour at certain critical periods and of excessive hours of work of men.

Child Labour. Legislation in our Province has raised the minimum age below which child labour is not permitted, to thirteen years. In the States of New York, Massachusetts and Illinois no child under fourteen years old is allowed to work during school hours or after seven o'clock at night. No child under sixteen is allowed to work more than eight hours a day, or after seven P. M.

Woman Labour. The conditions of woman labour must be so framed as to make due allowance for a suspension of work at certains critical periods of their lives, and, most particularly, protection from loss of place when a woman is compelled to suspend work for her confinement and its consequences, as in Germany.

Hours of labour for adults. Realizing that the matter of the length of the working day is a matter of very serious debate, your Commission cannot venture to take a definite stand or to make any categorical recommendations

as to what should be regarded as the number of hours of employ per week to be permitted in various trades and occupations. It realizes, however, very fully the importance of this matter, and that unduly prolonged hours of labour in confined rooms undoubtedly lower the vitality of workmen. At most we would venture to urge upon the Government that the time is ripe for a full investigation into the conditions of labour in various industries, an investigation leading towards a definite announcement on the part of the Government respecting the maximum hours of employment to be permitted in the various trades and industries.

To remedy the dangers here indicated **your Commission recommend:**

1. **That periodical inspection be made of all industrial establishments** two or three times a year by physicians who have received an adequate training in matters of industrial hygiene, the object of such inspection being the enforcement of sanitary laws, the development of scrupulous cleanliness of the premises, and the protection of workmen against the ignorance or carelessness of employers.

2. **That artisans be educated regarding the dangers peculiar to the trades in which they are employed, by means of written or printed instructions, and that yearly or half yearly lectures be given by the inspecting physicians.**

3. **That in dusty occupations the use of special ventilating appliances for the removal of dust be made compulsory.**

4. **That the law bearing on child labour be amended in the direction of the laws already enforced in certain States of the Union** whereby no child under thirteen years of age shall be permitted to work during school hours or after seven P. M. and no child under sixteen years of age shall be allowed to work more than eight hours a day or later than seven P. M.

5. That the Government inquire into the hours of labour demanded in the various industries of the Province to the end that legislation be introduced bearing upon this subject.

(c).—Auxiliary Measures

(a). — Popular Education

All these measures against contagion, unhealthy dwellings, alcoholism and anti-hygienic conditions of labour cannot have their full effect until the people meet the sanitary laws half way when they are convinced of their expediency and necessity. **The education of the people is therefore the basis of the campaign against tuberculosis which is a disease of the people.** Educational measures are manifold and all are important because they strengthen or complete one another.

1.—Anti-Tuberculosis Education at School

The elementary teaching of hygiene in schools, with a slightly increased development in higher educational institutions, has become one of the most pressing needs of our era, for we do not live now as formerly. The alarming

growth in the number of victims of tuberculosis is due to such a change in the manner of working and living. Everybody should be made acquainted with the dangers peculiar to modern life and it is proper that such education should begin at school because there we can reach the generation of tomorrow. But, as such education at school must necessarily be elementary and will leave no lasting traces in a great many, adults should be reminded of that first education and it should be completed by other means.

2. — The Press

One of the best means of reaching the people and keeping them constantly on the watch in matters of hygiene is that of the great daily papers. Moreover, it is their mission to educate the people. But, **in order that such a measure may be effective it should be under the direction of a competent person,** whose duty it would be to write articles on the subject and see to their periodical publication; otherwise one can expect nothing but incompetency, variableness and finally failure and forgetfulness.

3.—Anti-Tuberculosis Literature.

Printed matter in the shape of loose sheets or small pamphlets might be specially prepared for the various social groups such as: labor unions, workshops, factories, sick nurses, laundresses, painters, persons employed in dusty trades, staffs, teachers, benefit societies, hospitals, religious communities, the clergy, anti-tuberculosis and anti-alcoholic leagues, etc.

4. — Illustrated Lectures

To various groups; school children, workmen, office employees, etc. The Federal Government already gives a grant to the "Canadian Association for the Prevention of Tuberculosis" which is to give lectures in all the Provinces of the Dominion. Should not the Provincial Government imitate the Federal Government and devote a certain amount for this kind of popular education which is very effective if well managed?

5.—Anti-Tuberculosis Exhibitions

These are one of the most effective means because they convey anti-tuberculosis instruction to whole gatherings at a time and leave behind them a strong impression of what has been seen. Such exhibitions should be complete and methodicaliy installed so that the eyes may clearly see the preponderant factors of tuberculosis: contagion, the conditions that favour it. unhealthy dwellings, the injurious effect of alcoholism, dangerous trades, statistics, prophylactic measures and the pure air cure. The exhibitions should be shown in the various wards of the large cities and in small country towns. In large cities unoccupied stores might be used for such ward exhibitions.

6. — Inspections

The inspection of schools, industrial establishments and buildings where people are gathered together would not only have the result of enforcing the sanitary laws, but also of educating the people. Passing laws and regulations is not everything, steps must be taken to enforce them. To such lack of enforcement is due the fact of so many laws producing no results. On the other hand, the passage of an inspector who enquires into all details under his charge, attracts attention to such details and the result is an object lesson in the best way of teaching.

7. — Trained Nurses

It is the experience of all well equipped anti-tuberculosis associations that **the trained nurse, devoted to tuberculosis work is a first class instructor.** She visits the families indicated by the dispensary physicians, and, while so engaged, not only cares for the individual patient, but gives explanations and advice and distributes printed matter. In New York and Boston, a nurse is a leading factor in assistance, control and education, and the work she accomplishes is so highly appreciated that she is regarded as one of the most important elements in the campaign. A corps of special nurses may, as in Montreal, be provided by the Royal Victorian Order, and may be under the direction of the dispensary. Or where, for any reason this arrangement is inconvenient, your Commission are of opinion that the municipality itself should appoint and maintain a small staff of visiting nurses under the direction of the muicipal board of health.

8. — Mutual Benefit Societies

Could be an excellent means of education in connection with tuberculosis, for the members of such societies are visited by physicians and other special inspectors. It would be easy to make the directors of such societies understand that it is really in their interest to combat tuberculosis which on account of the number of its victims and the duration of the disease, causes a serious inroad on their funds and that it would be so easy for them to carry on an anti-tuberculosis education among their members by distributing printed matter, by lectures, by remarks on the anti-hygienic conditions of dwellings, etc. The Metropolitan Life Insurance Co. has already made a start in this excellent direction and its example should be followed by our mutual benefit associations. The physicians of those associations should be specially instructed as to the means of early diagnosis so as to prevent the evolution of a great many cases which, when ascertained at the outset, have a chance of being cured and are thus less costly to the society's funds and do not afterwards spread contagion in their families.

9. — Women's Societies

Woman might play a very important part in the campaign against tuberculosis. Unfortunately, in our province, there is no general movement towards

anti-tuberculosis organization among women. In Germany woman plays a prominent part in that campaign. Thus, there is the Women's Patriotic Society under the patronage of Her Majesty the Empress. In 1899 that society had 171,938 members. It has in its service 1,072 volunteer and 384 professional nurses. Such a society is the instrument by which aid is distributed to consumptives and their families. A woman, Lady Aberdeen, by forming many associations of women, established an effective organization in Ireland. It is important that our women be brought into the campaign against tuberculosis in our province, for woman has such influence over domestic hygiene that, without her concurrence, all the physicians' efforts are without avail.

10. — Schools of House-keeping

Also play a great educational role, for in those schools, young girls, the future mothers, are taught many things about the relations between milk, meat, alcohol, food in general, cleanliness and tuberculosis. Many physicians state that defective alimentation is a cause of the disease. Thus establishments where alimentary hygiene and domestic economy are taught, should be encouraged by the public authorities. There should be one in the centre and one at each corner of the large cities and, during the summer season, they might act as distributing stations for pure milk (**gouttes de lait**) which are so useful in preventing infant mortality.

11. —-The Clergy

Could exert a powerful influence if they would undertake a concerted movement throughout the province for the education of the people. If one Sunday in the year were set apart and reserved for a sermon against tuberculosis, much good could be accomplished. Priests and ministers come so frequently in contact with the people that they have almost daily opportunities of imparting hygienic instruction among families. To combat an evil whose source is the present social life itself, all social forces must combine against it.

12. — Anti-Tuberculosis Leagues

Are the pivot of the organization of popular education. They point out the extent of the evil, organize exhibitions, open air illuminated views in public parks in the evening where people gather together; they invite lecturers, distribute printed matter, take charge of dispensaries. **Every city and town in the province should have its league.**

13. — The Board of Health of the Province of Quebec

Is the centre where all educational means should be elaborated, such as the editing of anti-tuberculosis literature, travelling exhibitions, writing special articles for the press, books on hygiene for schools, and other educational establishments and certain inspections requiring special competency. With its present limited staff, our Board of Health could not meet all the needs of its mission, but when our Provincial Government learns that the

Province of Ontario gives its Provincial Board of Health an appropriation of $40,000 a year, it will not have any hesitation in increasing the appropriation of our Provincial Board of Health which has been only $20,000 for the last two years and before this only $12,000.

In connection with such means of popular education, the Commission recommend:

1. The elementary teaching of hygiene in schools and more extended teaching in normal schools, and higher educational establishments.

2. Graded books on the subject should be written by the Board of Health.

3. In future teachers should be required to have a knowledge of this branch of education.

4. The means of popular education should be under the exclusive control of the Provincial Board of Health because it is the most competent authority and its jurisdiction extends over the whole province.

5. The Provincial Board of Health should have moral support and sufficient pecuniary means for the fulfilment of its mission.

6. A municipal staff of nurses should be formed in cities and towns not already provided with a staff of dispensary nurses.

7. The formation of anti-tuberculosis leagues in all cities and towns.

8. The leagues should strive to get women to take a greater share and induce them to form district associations as in Germany; they should also strive to induce mutual benefit associations to join in the campaign against tuberculosis by convincing them that it is in their interest and at the same time in that of society. In fine, they might solicit the assistance of the clergy.

9. The establishment of schools of house-keeping should be encouraged, for such schools, by teaching domestic economy, frugality, cleanliness, healthy and economical alimentation, really educate against tuberculosis. Moreover they could distribute pure milk in summer for the prevention of infant mortality.

(b).— Protection of Childhood

In infancy the child is exposed to tuberculous infection from two sources: 1. from his parents; 2. from milk. Family contagion plays a more important part than infection by milk. All measures taken against contagion in the family will be effective in protecting the child. The most radical of such measures is either the removal of the consumptive, who is a constant source of danger to all the members of the family, or the removal of the threatened child. In many instances neither can be done, because there are not enough nor sufficiently spacious institutions to contain all who should be isolated. Then the municipal nurses or those attached to the dispensaries should show sick people, who are too poor to have a physician, how to protect the family from contagion. But as many as possible of such sick persons should be put in isolation pavilions and hospitals, for their removal from home is certainly the surest way to protect the family from contagion. In France another

method for protecting children is practised according to Prof. Grancher's system. This consists in boarding out for an adequate period among families in the country those children that are threatened with the disease or show the early signs of the same. For that purpose a society for the protection of children should be formed which would see to placing them out in the country.

As to the danger of infection by milk, pasteurization and the inspection of cow-stables are the proper means of protection.

In the second or school stage of childhood the dangers are those of lowered vitality from vitiated atmosphere and unhealthy conditions and of tuberculous infection, either from the teachers or more rarely from fellow pupils.

Methodical inspection of all the schools in the province can alone protect school children from the dangers of the school surroundings. It has been proved in chapter 11, section B, that nearly all our schools are overcrowded and lack ventilation and that many teachers who are tuberculous, continue to teach. The inspection should concern itself with the following points: 1. The children's state of health when they come to school at the beginning of the year and, periodically afterwards, should be entered in detail in personal health records, with information regarding the parent's health, because stricter supervision should be exercised over children living with consumptives. 2. Children with open tuberculosis should be excluded and their case reported to the Board of Health so that they may be given proper care; 3. The cubic air-space should be sufficient; 4. Heating should be properly effected; 5. Dry sweeping should not be done, but the sweeping should be with damp brooms or by vacuum process; 6. Overwork should be avoided both in games and in study; 7. Children who seem to suffer from lack of food owing to poverty, should be reported to the relieving boards; 8. A special inspection should be made for adenoids and bad teeth because they maintain defective nutrition; 9. The teachers should also be under the supervision of inspecting physicians and those who have open tuberculosis should not be allowed to teach.

Gymnastics on a rational system taught by competent teachers should form part of the curriculum. Several physicians state that in boarding schools young girls especially do not take enough exercise in the open air every day. In all cases physical exercises should be performed in pure air, at least in a ventilated room. Cities and towns should follow the example given by many American towns and have **playgrounds in populous districts.** The cities of Boston and Chicago among others have spent considerable amounts on playgrounds. As it is better to prevent than to have to cure, too much attention cannot be devoted to the protection of childhood.

In France especially very great attention is paid to this and admirable works have been founded. Besides Grancher's work mentioned above, there are **vacation colonies** and **sea-shore colonies,** which play a prominent prophylactic part. Vacation colonies consist in sending to the country pupils who have been found predisposed to tuberculosis by the medical inspector. We already have here in Montreal something resembling the vacation colony and

that is the "Open Air Fund." It would be advisable to have a larger number of children benefit by it, for that institution is almost, if not entirely, for English-speaking children. The sea-shore colonies are reserved for scrofulous children, because sea air is specially suited to that form of tuberculosis. Finally, following the example of Germany and of the city of New York, **open air classes** should be instituted for children with active tuberculosis, a happy medium for combining treatment with continuation of education.

For Adolescence, — the main danger is either premature or excessive labour under unhygienic conditions. In boarding schools young people do not always find proper hygienic conditions. In too many of these institutions which shelter them for many consecutive years, ventilation is insufficient in dormitories, class-rooms and studies; the food is deficient either in quantity or quality, bodily cleanliness is neglected, physical culture is overlooked or is not under scientific direction. **Nothing but an annual or semi-annual inspection can improve this deplorable state of affairs.**

A very powerful cause of weakening and wasting away among children and adolescents is **the use of tobacco.** In chapter II we saw that all teachers are unanimous in noting the bad effects of tobacco upon children and youths. **Tobacco is the alcohol of children.**

For protection of childhood, the Commission make the following recommendations:

1. The medical inspection of schools should be made general and unhealthy schools made healthy without delay.

2. Teachers and children with open tuberculosis should be excluded from schools.

3. Physical culture should form part of education and be under competent direction.

4. Urban municipalities should provide playgrounds for children and should contribute towards the institution and maintenance of vacation colonies and seaside colonies and open air classes for tuberculous children.

5. The work of children in factories should be regulated and supervised as recommended.

6. As the use of tobacco is very injurious to children's health, the law forbidding them to smoke and others to sell tobacco to them should be strictly enforced.

(c). — Preventariums

Prevention is infinitely better than cure. The very essence of prophylaxis consists in preventing disease from coming into existence. A great many persons become infected by tuberculosis solely through neglect of the necessary precautions for combating the debility which follows certain diseases or certain sickly conditions which are the forerunners of tuberculosis. Pleurisy, pneumonia, grippe, typhoid fever, are diseases which leave traces in the lungs and predispose to tuberculosis unless care be taken to combat such tendency by proper convalescence. How many anaemic, chlorotic and debilitated

persons would avoid the tendency to tuberculosis by timely care. Many of those who have to go to sanatoriums for a long, distressing and costly treatment, might by timely care in a preventarium escape the lack of suitable care at the proper time. If all the sick recovering from the diseases above mentioned and having predisposition to tuberculosis were to go for their convalescence to one of those establishments called preventariums where sanatorium methods are followed, they would escape the disease. The preventariums have had such excellent results in Germany that many of them have been established in that country. The Brehmer Rest under the management of Dr. T. A. Richer, at Ste. Agathe des Monts, is a type of such preventive institutions where for the modest sum of $4 per week, persons predisposed to tuberculosis, find not only rational treatment for restoring their health, but also learn anti-tuberculosis methods. **Next the dispensary, the preventarium is an important weapon of the armament against tuberculosis because it is prophylactic and educative at the same time.** The Commission, therefore, recommend the public authorities to promote the foundation of preventariums.

(d). — Sanatoriums

Sanatoriums are special hospitals reserved for persons with pulmonary tuberculosis who are susceptible of cure or of lasting improvement. The sanatorium is therefore, above all, a special method of treatment and a complete or relative cure. It is also, however, an instrument of prophylaxis, for, the patients cured are so many sources of contagion that have been removed. Still another and one of its greatest merits, is that it is the best educative anti-tuberculosis method. When a sick person has spent some time in a sanatorium, he has learned all the necessary precautions to prevent the sowing of contagion in his family and elsewhere; he has learned at the same time to take proper food and to observe all the rules of hygiene which maintain health. The tuberculous person who has been cured in a sanatorium and continues to live in accordance with the rules of hygiene in order to keep up his cure, is an example with great educative influence. But, unfortunately, as the sanatorium can cure but a very small number as compared with the enormous number of sick who should be under treatment, it no longer holds the preponderant place it held at first in the struggle against tuberculosis. It retains its importance as regards the treatment of well to do people who can devote the necessary time and means to it, but as a means of reaching and influencing the bulk of cases of the disease, the dispensary and the isolation hospital are of much higher value. From economic grounds the Commission would show itself unpractical were it to recommend the building and maintenance of sufficient sanatoriums to treat the curable cases of tuberculosis in this province. Prevention is better than cure and that is the object of prophylaxis.

Social protection by prophylaxis is of far greater importance than social protection by treatment. Moreover, the idea of carrying on prophylaxis by treatment cannot be realized because it is impossible to treat all the consump-

tives in the country within a given time. Even Germany with its 87 sanatoriums in which thousands of consumptives can be treated in a year, has found out that it lacks other very important weapons of the anti-tuberculosis armament and has turned its efforts to having as many dispensaries as possible. Moreover in order to be able to shelter and treat the most of the sick in sanatoriums, a special feature is necessary which Germany alone possesses, and that is the compulsory insurance of workmen against sickness and accidents. The aid given by such insurance alone can permit of the erection and maintenance of a very large number of sanatoriums. Does this mean that the sanatorium should be struck from the list of protective measures against tuberculosis? Far from it. The Commission have no intention of ignoring the services it can render as a means of popular education. The idea of the curability of tuberculosis must be kept alive in the public mind and, to that end, there is nothing better than the maintenance of institutions for the cure of the disease and for showing the people living examples of such cure. Add to this, that persons cured are missionaries who teach others how to live in order to ward off the disease. Neither do the Commission deny that, to a certain extent, the sanatorium has a prophylactic effect, since so many persons cured or treated, mean so many sources of contagion removed. But, in view of the mass of consumptives who can never avail themselves of the sanatorium treatment, they hold that there are more urgent means to be brought to bear in the campaign against tuberculosis and in their opinion, the dispensary, which traces out, educates, isolates and introduces hygienic measures all at the same time, performs the greater service, and as the isolation of certain of the sick poor in their crowded homes will always remain an impossibility, we must at once, provide, after the dispensary which discovers those who are sick, for the isolation of these cases in suitable quarters. On the standard of prophylaxis should be written these words which are its essence: **"Trace out, educate, isolate, make healthy."** Through the dispensary or rather through dispensaries that end will be attained.

To this statement your Commission are of opinion that one exception is to be made, namely the dispensary can only act efficiently in towns. In sparsely populated rural districts it is impossible by this means to supervise adequately the widely scattered cases. The only feasible plan that suggests itself to your Commission for dealing with this problem with any degree of success, is that the neighbouring **rural municipalities should combine to establish sanatoriums, not for the treatment but for the education of their curable cases.** Rural municipalities, even with Government subsidies, could ill afford to maintain these cases in a sanatorium for from four to six months at the rate of $7.00 per week per head, for that would be the cost of sanatorium treatment. They might well afford, with Government aid, to send such patients to the sanatorium for four weeks and in this shorter period the patients could be thoroughly instructed in the principles of the rest and open air treatment, — the one effective method known to us — and in this method of prevention of self infection and of infection of others. The cost of this educative treatment to the

community would be roughly one sixth of the cost of the ordinary curative sanatorium treatment. In short, it is from the educational point of view that the sanatorium is of the greatest value to the community, showing the patients how to join rationally in treating themselves and in prevention, and impressing upon the public the idea of curability of the disease. In the appendix is shown what is being done by other countries and other provinces in this matter of sanatoriums. The only object the public authorities, both government and municipal, can have for procuring the treatment of a disease is either prevention or education. Now from these two standpoints the dispensary has greater results than the sanatorium. Nevertheless the sanatorium is a valuable weapon in the anti-tuberculosis armament; it completes the organization. Its importance will doubtless lessen as the people become educated by other means, but at present the sanatorium is an excellent means of popular education because it keeps alive the idea of the curability of tuberculosis and shows people striking examples of the cure. The Commission are of opinion that the public authorities should encourage the establishment of sanatoriums. They do not wish, however, to determine the manner in which such encouragement should be given, leaving the public authorities to be guided by the examples given by the other provinces and the neighbouring States which are entered in the appendixes to this report.

(e). — Agricultural Colonies

Agricultural colonies are an almost necessary dependency of sanatoriums designed for curative treatment. The consumptives, after a residence of from three to six months in complete rest at a sanatorium, cannot without danger of a relapse, face, at once, without preparation, without previous training, the abrupt resumption of work and the anti-hygienic surroundings of the workshop or factory. For some years past, all the sick have not been left without occupation, but those who can, are made to do light work, preference being given of course to open air work. For this purpose, all the farm work is entrusted to the patients of a sanatorium who are more or less able to work under the supervision of physicians who distribute and grade the work. The work is remunerated so as to encourage the patients to shake off the habit of inaction and to earn a portion of their board. As physicians advise those people to remain in the country, instead of returning to town, some once more become country dwellers to their own benefit and that of the community. The establishment of farm colonies is therefore an excellent thing and may even be said to be necessary to a complete anti-tuberculosis organization. It forms an essential part of an organization in the city of Edinburgh. In the United States the Young Men's Christian Association have, at Denver, a farm for consumptives, containing 34 acres in area for gardening and 60 acres of uncultivated land. The Commission consider such farming colonies as a very useful complement of the anti-tuberculosis armament and recommend them to the attention of public authorities, philanthropic associations, mutual

benefit associations, insurance companies and agricultural schools such as those of the Fathers of Oka and at Lake St. John.

(f). — Insurance Against the Disease

Our insurance companies might follow the example of those in Germany and become **one of the leading factors in the struggle against tuberculosis.** And it would be in their interest to do so, because tuberculosis costs them an enormous sum. Thus, to give an example, the Prudential Life Insurance Company of America has told us that 10,000 of its insured die of tuberculosis every year and that this entails a loss of $110.00 per head or a total of $1,100,000.00. The money which the insurance companies might employ in lessening the number of lives prematurely lost and the loss of wages through incapacity to work resulting from tuberculosis, would be well invested and would yield them a handsome profit. The Germans have understood this and have put it in practice long ago, enabling them to mobilize against tuberculosis forces organized as nowhere else. It is in fact the only country which can treat about 20,000 tuberculous patients per annum in hospitals thanks to its 87 private and public sanatoriums. Now it is insurance, made compulsory by the State, which has enabled the German empire to bring its organization to a degree of efficiency and perfection unknown in other countries. Thus the result has been that the mortality in Prussia which was in 1886, 31 or 32 per 10,000 inhabitants, dropped to 21 in 1900 to 17.26 in 1906 and 16.46 in 1908, a reduction of one half. Professor Frankael is of opinion that this result is chiefly attributable to the many sanatoriums, the erection and maintenance whereof have been made possible solely through the money accumulated under the compulsory insurance imposed on workmen and employers by the State. There are 15,000,000 insured. But the erection and maintenance of sanatoriums are not the only benefits derived from compulsory insurance. It has also enabled accessory means of great importance to be added to the anti-tuberculosis organization. Thus, the funds at the disposal of the insurance companies, after being applied to the erection and maintenance of sanatoriums, to the relief of poor families, has also been applied to important supplementary measures, such as loans to benefit societies for building cheap healthy dwellings, to the support of agricultural and vacation colonies, to the assistance of women at their confinement, to the building of public baths, to the establishment of easy means of communication for workmen in cities to enable them to procure healthier and cheaper lodgings, to establishing preventariums or convalescent homes, etc., etc. Moreover, this compulsory insurance to which both employers and workmen contribute, has the effect of bringing together those who were formerly in hostile camps. The consumptive also, instead of being reduced to the humiliation of asking some institution for charity, has on the contrary merely to claim a right, since he contributes to the general savings fund of the insurance. Finally this system has also the advantage of educating people, of making them more provident and therefore diminishing hardships which promote tuberculosis. In view of all

these advantages that would result from the intervention of insurance associations or from the establishment in our midst of compulsory insurance for the working-classes and for manufacturers, the Commission recommend: 1. that the German system for compulsory insurance of workmen in factories with a contribution of the employers, be studied with a view to its introduction in our province; 2. that, if the German system is impracticable in our Province, some of the public authorities, the Provincial Government, the Provincial Board of Health or incorporated anti-tuberculosis leagues, should endeavour to obtain the assistance of our mutual insurance associations.

(g). — Co-ordination of Means.

The enumeration of all the means that should be adopted to combat the chief causes of tuberculosis of social origin is not sufficient. **To be efficient they should be mobilized as a whole and be directed towards the end to be attained.** For this it is first of all necessary that they be ranged according to their degree of importance and then be made to act co-ordinately. Germany has realized it and her anti-tuberculosis armament runs like clock-work, each part fitting into another, and the whole moving towards a sole object. France also has realized it, for there all works, leagues and societies for the promotion of public hygiene have been combined, the better to co-ordinate the national effort, under the name of "L'Alliance d'Hygiene Sociale", whose president is Mr. Casimir Perrier, ex-President of the French Republic. **Not only is co-ordination of means necessary but also perseverance in efforts** which must not be spasmodic but continuous for a quarter of a century. To make the effort continuous, a clear conception is needed of the evil to be combated, of its social and economic importance and of the greatness of the undertaking. From the first chapter of this report the public authorities will have gained an idea of the extent of the evil and of the economic importance of the question. To have an idea of the greatness of the undertaking, they have but to consider the fact that tuberculosis, which is found in all classes and conditions of social life, is consequently **a problem of social economy.** But the prejudices of the present generation must be dispelled and a new generation be prepared with other habits. It will be necessary to attack private interests ,such as those of proprietors of unhealthy dwellings, of factory owners, who think only of their personal profits in exploiting human labour; of the sellers of infected milk and toxic alcohol; in a word it is necessary to bear in mind that **all the conditions of life of the people must be improved.** Such a task is immense, but it is imperative, in the first place because, if it be not undertaken, the evil will only be aggravated and weigh more and more heavily upon the nation. The Government's ideal must be to continually improve the condition of our people. Now, **all that will be done to improve the people's condition and their degree of civilization, means in reality cutting the roots of tuberculosis.** Public hygiene has so fully proved its value that it has become a necessary and most important department in the government of civilized nations. Its degree of

perfection is even taken at present as a criterion of the degree of a nation's civilization.

But if success depends upon the proper organization of the campaign against tuberculosis and upon the co-ordination of means, who should be the co-ordinating and directing authority? The State, the municipality, a group of citizens, all are interested in and are all essential to the solution of this problem, because a social disease calls for a social remedy. And as all these three categories cannot alone successfully carry out this great undertaking, they must combine and help one another. The Government should co-operate in the campaign against tuberculosis because the protection of public health is one of its most important duties, because that disease is more serious than any other, through the number of its victims among the working classes, through the enormous loss of money it entails, through the family and social degeneration it causes; because the education of the public is a duty of the State as well as a continual improvement of the conditions of social life. The campaign against tuberculosis stands upon this tripod: **Education, Legislation** and **Money.** Now, the first two factors are within the province of the State; as to the money needed, philanthropy will never have enough and the Government must therefore devote a portion of the public money to a public good. Moreover, **the expense of combating a disease that entails so great a loss of money will be amply compensated by the result, even from a purely economic standpoint.** The municipality, which is a small local government with sanitary laws and regulations to apply and which is interested in having all its citizens enjoy the greatest possible well-being, also has its share of responsibility. Finally, as there are limits to the action both of the Government and of municipalities, the citizens in their own interest and in that of human solidarity, should furnish what is called the contribution of philanthropy. But, admitting such co-operation of the State, the municipality and the citizens, there still remains the apportionment of their share of responsibility in the common action. What should the State, the municipality, the citizens do?

THE STATE

Upon the State devolves the duty: 1. Of educating the people, because general knowledge of the true cause of tuberculosis and of the means of avoiding it, is the pivot of the campaign against tuberculosis; 2. Of enacting laws to protect childhood from unhealthy schools, youth from premature labour in unhealthy factories, adult workers, men and women, from the anti-hygienic conditions of industrial labour, the public generally from unhealthy dwellings: of applying the means that have been found effective; of giving municipalities power to adopt regulations according to the requirements of each locality; of vesting the Provincial Board of Health with sufficient power for enforcing the law when municipalities are neglectful; of aiding by money grants the carrying out of preventive measures according to the degree of their

importance; 4. Of taking the proper steps to have the laws and regulations observed.

With so many and apparently complex methods aiding the eradication of tuberculosis the principle which should guide the Government, in determining which primarily to support, must be that of prevention. The Government cannot directly undertake the treatment of the disease, that is a matter for private individuals and for philanthropic associations. And if the Commission are of opinion and urge that the Government contribute towards the erection and maintenance of dispensaries and isolation hospitals, they do so because of the proved preventive value of these institutions.

Municipalities

Upon municipalities devolves the duty: 1. Of enforcing the provincial health laws and the regulations respecting unhealthy local conditions; 2. Of establishing one or more anti-tuberculosis dispensaries in proportion to their population as they are the first line of defence against tuberculosis; 3. Of isolating patients in an advanced stage of tuberculosis in special pavilions of existing hospitals; 4. Of aiding families in distress owing to the removal of their head to a hospital; 5. Of having the sputa of patients examined microscopically free of charge, at the municipal laboratory; 6. Of disinfecting, free of charge, the rooms of houses inhabited by infectious tuberculous persons; 7. Of preventing the building of unhealthy dwellings and of making unhealthy quarters healthy; 8. Of taking effective measures against street dust and uncleanliness generally; 9. Of providing playgrounds for the children in popular quarters; 10. Of having medical inspection of schools; 11. Of establishing open-air schools for children found to be tuberculous by the inspecting physician; 12. Of passing by-laws to protect children from infected milk; 13. Of exercising proper supervision over meat in slaughter-houses; 14. Of facilitating conveyances so that workmen may live away from the centre of the city; 15. Of establishing shower-baths for the education, cleanliness, and comfort of the working classes; 16. Of subsidizing according to their importance, the preventariums and sanatoriums established by philanthrophy.

Philanthropy

Upon philanthropy devolves the great task: 1. Of establishing preventariums, or convalescent homes to prevent tuberculosis in those who are predisposed to it, especially through debilitating diseases such as: pneumonia, pleurisy, grippe, typhoid fever, puerperal fever; 2. Of establishing sanatoriums with Government and municipal aid for the treatment of indigent consumptives who have a chance of cure; 3. Of establishing agricultural colonies which are an almost indispensable complement of the sanatorium; 4. Of establishing vacation colonies for children who are predisposed to or are even affected by tuberculosis; 5. Of promoting the formation of associations for building cheap healthy houses for the working classes; 6. Of collecting money to aid the sick sent to sanatoriums and families in distress.

The Individual Citizen

Upon the individual citizen devolves the duty: 1. Of declaring cases of tuberculosis to the municipal health authorities; 2. Of contributing to the relief fund for, by contributing to the lessening of the number of the foci of contagion, one works for one's own safety; 3. Of insuring against illness.

Medical Profession

Upon the medical profession devolves the duty: 1. Of declaring all cases of tuberculosis; 2. Of educating people during the ordinary practice of their profession. All this may be summed up in the following table:

Government.	Education of the people. Legislation. Enforcement of the law. Pecuniary aid to preventive measures.
Municipalities.	Carrying out the provincial laws. Establishment of anti-tuberculosis dispensaries. Placing patients in an advanced stage of tuberculosis in hospitals. Assisting families in distress. Disinfection of contaminated houses. Examination of sputa, free of charge. Preventing the existence of unhealthy dwellings. Making unhealthy quarters healthy. Combating dust and uncleanliness. Playgrounds for children. Medical inspection of schools. Open air schools for tuberculous children. Control and sale of milk and meat. Transportation facilities. Public bathing facilities.
Philanthrophy.	Preventariums. Sanatoriums. Agricultural colonies. Vacation colonies. Cheap healthy dwellings. Relief funds.
Citizens.	Declaration of tuberculosis. Contribution to relief fund. Insurance against illness.
Medical Profession.	Declaration of tuberculosis. Elucation of the people.

Such are the responsibilities of each social force, clearly laid down. There now remains the co-ordination of the movement of such forces. It is necessary, for this purpose, to consider the general or provincial co-ordination and the municipal co-ordination.

General Co-ordination

The country that gives the best example of general co-ordination is Germany, but we cannot think of adopting its plans of defence against tuberculosis because it rests in a great measure upon means we have not now, that is the compulsory insurance of workmen, which alone has enabled Germany to build and maintain eighty-seven sanatoriums. Moreover, its system, as it now stands, is the outcome of many years' study and of successive improvements. Thus, finding that its sanatoriums did not give the expected results, that they did not constitute the whole armament against tuberculosis and that there were other means whose usefulness and efficiency had been proved in other countries, the Germans added to their armament dispensaries, preventariums or convalescent homes, agricultural colonies, improvement in dwellings, visiting nurses and information bureaus, etc. After many years of organization, theirs is the most complete in existence, but ours has yet to be effected. What authority will effect such organization in our Province? Who will co-ordinate and direct the means we already and will soon have? Who will promote the establishment of complementary measures? If some higher authority does not organize, co-ordinate and improve that anti-tuberculosis campaign in our province, it may be predicted that only isolated spasmodic efforts will be made. In twenty years, we shall be in the same and even in a worse position, because we shall not be inclined to begin over again efforts that have apeared ineffective. Thus, some authority must organize and co-ordinate the campaign against tuberculosis. That authority should be the Provincial Board of Health. Just as the Commission found it necessary to recommend the appointment of a veterinary surgeon who would be attached to the Department of Agriculture and whose duty it would be to educate farmers respecting bovine tuberculosis, to distribute tuberculin and supervise its use, to enlighten and co-ordinate the efforts made to bring about the disappearance of tuberculosis among milch cows, so also is it necessary to confide the task of organizing the campaign against human tuberculosis, which is infinitely more important than the other, to a physician specially competent in the matter and attached to the Provincial Board of Health. **As the Municipal Board of Health should be the central point of the Municipal campaign against tuberculosis so also should the Provincial Board of Health be the centre of the organization and direction of the Provincial campaign.**

The Board's staff should be increased to enable it to thoroughly fulfil its mission. Lately a new branch has been formed, that for protection of streams, with a view to the prevention of typhoid fever; now the ravages of tuberculosis are infinitely greater and it also deserves a special branch. Such a physi-

cian, who would be the director of anti-tuberculosis measures, would visit existing leagues, would promote the formation of new ones, would convene their representatives in congresses for the purpose of study, would see that philanthropic relief associations are in communication with the dispensaries and other institutions, would direct the means of popular education, would induce mutual benefit associations to co-operate in the campaign, would see to the proper use of the money granted by the Government, etc. Without such a general direction and constant inciting and watching, the result of the present efforts would be insufficient.

Municipal Co-ordination

We have excellent models for imitation in connection with the co-ordination of municipal mesasures such for instance as the city of Edinburgh and the city of New York. Municipal co-ordination should be based on the following principles: the active centre is the dispensary, and the centre of co-ordination is the Municipal Board of Health. The dispensary discovers the sick and reports them to the Board of Health, which has them visited in their homes by the inspectors, finds places in hospitals for indigent patients in an advanced stage of the disease; places in the sanatoriums those in a curable state; disinfects rooms and dwellings, informs the relief societies of the poor families and those in distress who should be succoured and sends to the societies for the protection of children those found by the inspecting physician to be tuberculous.

Hitherto, the Municipal Boards of Health have not realized their responsibility in connection with tuberculosis. In future they must look on tuberculosis as an infectious disease and fight it as they are bound to fight other diseases. Tuberculosis requires all the attention because its ravages are greater than those of all the other ordinary diseases combined. The Board of Health of the city of New York has realized this and has constituted itself the centre of action and of co-ordination of all means of combating tuberculosis. The details of anti-tuberculosis organization of that great American city and of Edinburgh will be given in the appendixes. App. II and III.

In short, as the methods of the anti-tuberculosis campaign are numerous and of unequal value it is advisable to indicate the most urgent, that is to say, those with which we should begin. In the first place every means should be taken to educate the people, then dispensaries should be established because they are the most efficient and least expensive of all means; finally arrangements should be made with existing hospitals for the isolation of indigent consumptives in an advanced state who cannot be properly isolated at home. This done, the work of the dispensary must be steadily expanded until it embraces a general co-ordination of all the means of cure and of aid to the tuberculosis patient and those depending upon him. Philanthropic associations must be established to aid the patient and his family and societies undertaking the establishment and direction of vacation colonies, sanatoriums, agricultural colonies, etc.

Finally, improvement of the conditions of industrial labor, of health in cities and dwellings, the decrease of alcoholism and poverty will come gradually by carrying out the recommendations of the Commission and the anti-tuberculosis armament will be completed. After two decades of continuous and well organized struggle, we may hope to lower mortality from tuberculosis to the proportion of that from ordinary diseases. Of course, there will still be consumptives, but tuberculosis will have disappeared as a social disease. Besides this well founded-hope there is another reason, for undertaking the campaign for, by fighting tuberculosis by the means suggested by the Commission, we shall improve all the conditions of human life, and work for the realization of a **more perfect civilization.**

C. N. VALIN, M.D.,
Reporting Secretary.

CHAPTER IV.

Appendixes

I

Present condition of the campaign against Tuberculosis in the various Provinces of the Dominion.

PROVINCE OF ONTARIO

Of all the provinces Ontario has certainly carried on the most extensive campaign against tuberculosis. Its legislation is not, on paper, as thorough as that of the Province of Quebec, but its institutions are more numerous. Thus, besides the two great associations, "The Canadian Association for the Prevention of Tuberculosis", whose headquarters are in Ottawa, and the "Muskoka National Sanatorium Association" whose headquarters are in Toronto, there are in the Province of Ontario about seventeen anti-tuberculosis leagues or associations without counting the 36 local branches of the National Sanatorium Association. There are eleven sanatoriums, six of which admit free of charge poor patients who are unable to pay. There are four dispensaries. To these must be added the Hospital for Sick Children and Lakeside Home to which tuberculous are sent during the summer. The Toronto free hospital for consumptives has a special pavilion for children and the Heather Club has in its service a nurse who visits tuberculous children. Not only the capital has such a good organization, but even secondary cities such as Hamilton and Kingston have each their sanatorium, dispensary and isolation wards, while small towns, such as St. Catherines with barely 9,900 souls, have a sanatorium or isolation under tents as at Stratford, Galt, Peterborough, etc. The following is the enumeration, location and number of beds of the sanatoriums.

INSTITUTIONS.

Sanatoriums and Isolation Hospitals.

Toronto.—"Toronto Free Hospital for Consumptives", Weston, 100 beds for advanced cases where the patients partly pay if they can.

Hamilton.—"The Mountain Sanatorium", thirty-five beds for curable cases from the city of Hamilton and the county of Wentworth under the direction of the Hamilton Health Association; then, for advanced cases: "The Southern Home", twenty-five beds, on the grounds of the City Hospital where the patients pay a portion of the costs of treatment if they are able. This also is under the direction of the Hamilton Health Association.

London.—"The Alexandra Hospital for Consumptives", forty beds, for patients from London and the county of Middlesex, who pay a portion of the expense if they are able. Under the direction of the London Health Association.

Kingston.—The "Sir Oliver Mowat Memorial Hospital" for consumptives on the grounds of the General Hospital, twenty-five beds for patients from Kingston and the county of Frontenac, who pay what they can.

Ottawa.—The "Lady Grey Hospital for Consumptives", forty-five beds for advanced cases, with tents, etc., for curable cases in the grounds of the hospital. About one in five of the admissions contribute to their maintenance. Under the direction of the Ottawa Anti-tuberculosis Association, with the co-operation of the Tuberculosis Committee of the May Court Club.

Weston.—"King Edward Sanatorium for Consumptives", containing twenty-five beds for advanced cases; the patients pay from eight to fifteen dollars per week.

Gravenhurst.—The "Minnewaska", with twenty-five beds for curable cases only and where patients pay from eight to fifteen dollars per week.

Gravenhurst.—"Muskoka Cottage Sanatorium" with seventy-five beds for curable cases and where patients pay from twelve to eighteen dollars per week. Under the direction of the National Sanatorium Association.

Gravenhurst.—"Muskoka Free Hospital for Consumptives" with one hundred and forty beds also under the direction of the National Sanatorium Association.

St. Catherines.—Three sanatoriums with fifteen beds for patients from that town and from the county of Welland.

Total number of beds in those various sanatoriums: (550) five hundred and fifty, besides those under tents in the cities and towns of London, Kingston, Ottawa, Peterborough, Stratford.

DISPENSARIES

Toronto has two dispensaries; one at the General Hospital and the other at St. Michael's Hospital.

Hamilton has a dispensary and so has Ottawa.

LEGISLATION.

The Province of Ontario has legislation which permits it to grant pecuniary aid towards the direction and maintenance of sanatoriums and isolation hospitals by giving one fifth of the cost, of every sanatorium built by an association, municipality or county, the provincial contribution not to exceed, however, four thousand dollars for any establishment. Already eight sanatoriums have received such aid and the sum of $100,000.00 has been paid in five years. Moreover, the legislation of 1909 allows the Government to aid the maintenance of such institutions by paying $3.50 per patient per

week. The Legislature has also empowered municipalities to contribute towards the building of sanatoriums and the maintenance of patients at the rate of $1.50 per head, per week.

The Sanatoriums-Act provides that they be built at least one hundred and fifty yards away from dwellings. The permission of the Local Board of Health must also be obtained.

The Factories and Shops-Act provides for ventilation and enacts that three hundred feet of cubic air space be given to each operative. The factory inspector may compel employers to provide spittoons to be kept in good order and also to put up mechanical ventilators for the removal of dust by suction.

Municipalities are also empowered to pass by-laws respecting spitting in public places and respecting unhealthy dwellings and quarters.

The municipal laboratories of Toronto and Kingston examine sputa free of charge to assist the diagnosis of tuberculosis.

The Provincial Board of Health places at the disposal of the municipalities a travelling anti-tuberculosis exhibition as a means of educating the people, provides lectures, and prints and distributes abundant pamphlets and anti-tuberculosis literature.

As everywhere else, the physicians are the most devoted in their personal efforts in the struggle against tuberculosis, but they are assisted by ladies and nurses. Thus, in Ottawa, there is a "Ladies Visiting Comittee," whose task it is to visit patients when they leave the sanatorium to see that they live so as to retain the benefit of the cure. The committee also helps families while their head is under treatment. It is, in fact, a relief organization, a very important element in the campaign against tuberculosis.

All this shows that the anti-tuberculosis movement is not only on an extensive scale, but that it is also well co-ordinated. This does not mean that the movement in its entirety is adequate to all needs, because for this it would have to be largely increased, but, nevertheless, it is the greatest co-ordinated effort made in Canada. And our neighbours show that they understand it is only the beginning of the campaign because they are striving to promote the formation of fresh leagues and associations in every corner of the Province, to co-ordinate all their forces and effective movement by concentrated efforts.

To that end, the Canadian Association for the Prevention of Tuberculosis have instructed their secretary, Dr G. Porter, of Toronto, to begin an extensive educational campaign, to urge municipalities to combine their forces and co-ordinate all their efforts.

PROVINCE OF QUEBEC

Legislation.

We have in our Province legislation which is considered a model one by our neighbors of Ontario. In truth, it would leave little to be desired if it were faithfully carried out. It provides : 1. For compulsory declaration of

open tuberculosis; this has remained a dead letter so far and yet the heads of the campaign in all countries consider it of the highest importance to know the places where the disease exists ; 2. for prohibiting spitting in public places ; 3. for disinfection of the rooms or the dwellings infected by consumptives in an advanced stage of the disease, either when they have left the premises or after their death ; 4. in connection with dwellings, for regulations respecting the space, natural light in dwellings, the space to be left clear around dwellings, the cubic air space in night refuges, the use of a cellar protection against dampness by an impermeable or damp proof layer between the soil and the walls; 5. in connection with factories, for regulations respecting light, the cubic air-space to be given each operative, ventilation, the removal of dust in factories by mechanical suction ; 6. in connection with educational institutions, regulations respecting cubic air space, ventilation, natural light, sweeping ; 7. in connection with cow-stables, for regulations respecting the declaration of tuberculosis, the isolation of suspected cows until they are examined by a veterinary surgeon; 8. for the confiscation of tuberculous meat.

Education

The Provincial Board of Health publishes a Health Bulletin and many pamphlets which are distributed free of charge to physicians, to the clergy and to the public

The Board of Health has a travelling anti-tuberculosis exhibition which it lends **gratis** to all municipalities that ask for it. The laboratory of the Board of Health examines free of charge the sputa sent by physicians from all parts of the Province.

INSTITUTIONS

For Advanced Cases

The "Hospital for Incurables," Montreal, belonging to the Sisters of Providence, has fifty beds. The "Grace Dart Home," St. Antoine St. Montreal, organized by private subscription, has twenty beds.

Curable Cases.

" The Laurentian Sanatorium," at Ste. Agathe des Monts, now being built by the Sanatorium Society, will have fifty beds at the moderate price of $7.50 per week per patient.

The " Lake Edward Sanatorium," on the lake of the same name, north of Quebec, belonging to an association, has twenty-five beds.

" The Children's Memorial Hospital," Montreal, has special pavillions for tuberculous children and verandahs for air-cure. It has fifty beds.

For Pre-Tuberculous Cases.

"The Brehmer Rest," at Ste. Agathe des Monts, a preventarium belonging to an association of ladies under the high patronage of Her Excel-

lency Countess Grey, and under the direction of Dr A. L. Richer, has fifteen beds.

Total beds : two hundred and twenty (220) — as compared with five hundred and forty (540) in the neigboring province.

Dispensaries

In Montreal, the "Royal Edward Institute," due to the generosity of Lt.-Col. Burland and his sisters, can compare with any institution of the kind on the continent. It is, in reality, the headquarters of the Montreal Anti-Tuberculosis League and is a continuation of the league's old dispensaries.

The general plan upon which the Royal Edward institute is conducted is that developed by Dr Philip, in Edinburgh, which will be found described in section III. It deserves particular note that the institute is intimately associated with the City Board of Health, which allows one of its inspectors to devote his whole time to anti-tuberculosis work, visiting and reporting upon cases, distributing literature which has been published under the direction of a committee of the institute, but at the charge of the city, distributing also sputum cups to patients and supervising the disinfection of rooms and houses that have been occupied by open cases of the disease. Further, the Board of Health depends upon the dispensary to report all applicants for the beds for advanced cases at the Hospital for Incurables, which are maintained by the city. The Victorian Order of Nurses, by placing four of their nurses at its disposal and by reporting cases of the disease encountered by their visiting nurses, the Charity Organization by reporting cases and arranging for the deportation of tuberculous immigrants, and the Diet Dispensary by providing nourishing food for advanced cases, all co-operate with and aid the Royal Edward Institute.

Leagues and Associations

We have in the Province four anti-tuberculosis leagues, those of Montreal, Quebec, of the District of St. Francis and Three Rivers, a Ladies Committee promoting anti-tuberculosis exhibition, the organization of the Citizen's League for Hygiene Reform and the by-law prohibiting expectoration in street cars and on side-walks.

The Provincial Government

In January 1895, the Provincial Government granted four hundred acres in the Park at Montagne Tremblante, to the Montreal League and in 1905, 137 acres at Lake Edward to a Quebec Association.

BRITISH COLUMBIA

Legislation

The law decrees : 1. compulsory declaration of tuberculosis ; 2. disinfection of the house or dwelling contaminated by consumptives ; 3. prohibition to spit in public places ; 4. the obligation on the part of milkmen to

have a certificate from the Provincial Veterinary Surgeon attesting that the herd of cows from which their milk is obtained is free from tuberculosis.

The Legislature voted $50,000.00 to the British Columbia Anti-Tuberculosis Association to aid them in building a sanatorium for curable cases. Moreover, the province aids in the maintenance of patients in the sanatorium by giving fifty cents per head per day. The Provincial Board of Health asks that the General Hospitals receive consumptives, in an advanced stage of the disease, in special pavillions, and the Vancouver Hospital has an isolation pavillion for advanced cases.

The Provincial Laboratory examines patients' sputa free of charge.

Institutions

"Tranquille Sanatorium," at Kamloops, has thirty beds, free of charge, for curable cases. Riverside Cottage, also at Kamloops, has fifteen beds for cases in the incipient stage and for patients paying full cost.

MANITOBA

Legislation

Municipalities are empowered to pass by-laws for prohibiting expectoration by consumptives in public places, for the compulsory testing of herds, of milch cows with tuberculin, for the seizure and destruction of tuberculous meat.

Patients' sputa are examined free of charge in the Provincial Laboratory.

The Legislature has granted a charter and pecuniary aid to a Board of Commissioners for the establishment of a sanatorium to be controlled by the Province. The Legislature has also empowered municipalities to contribute to the erection and maintenance of sanatoriums.

Institutions.

"The Manitoba Sanatorium for Consumptives" has sixty beds for curable cases. The "Winnipeg City Hospital" has thirty beds for advanced cases.

The city of Winnipeg has an association for the prevention of tuberculosis.

Moreover, all the towns and incorporated villages work with the provincial authorities for the maintenance of the sanatorium.

ALBERTA

Legislation

Compulsory declaration of tuberculosis and of patients' change of residence.

Disinfection after their death or departure.

Examination of sputa free of charge.

General hospitals are obliged to provide accommodation for poor patients in an advanced stage of tuberculosis.

Institutions.

There are five associations affiliated with the Canadian Association for the prevention of tuberculosis and whose aim is to educate the people.

NOVA SCOTIA

Legislation

Regulations against spitting in public places.
Medical inspection of schools.
Examination of sputa free of charge in the Provincial Laboratory.

Institutions

A provincial sanatorium with twenty-five beds at Kentville chiefly for purposes of education. This sanatorium cost $20,000.00 and receives $9,000 yearly for its support. The patients pay $5.00 per week.

The Halifax League supplies the poor with pavillions which can be taken to pieces.

There are twelve leagues in the Province.

NEW BRUNSWICK

The Government has offered pecuniary aid towards the erection of a sanatorium and has appointed a commission to devise measures against tuberculosis. There is an anti-tuberculosis dispensary at St. John.

PRINCE EDWARD ISLAND

Since 1909, the anti-tuberculosis society for King's and Queen's county has organized a dispensary in Charlottetown, the capital.

NEW FOUNDLAND

In August 1908, the Newfoundland Association for the Prevention of Consumption held an anti-tuberculosis convention in St. John's, the capital of ..ie Island, which lasted five days and was attended by 500 teachers.

REMARKS

The above review of the means employed by the various provinces for ..ombating tuberculosis, shows that the necessity of fighting that plague is admitted. But in the majority, if not in all, of them, the means are not commensurate with the efforts made, owing to lack of co-ordination The province that has displayed the greatest zeal is certainly Ontario. It has the most important and most numerous associations, the largest number of sanatoriums, isolation hospitals and dispensaries. Our neighbours have attached as much importance to the isolation of advanced cases as to the treatment of

incipient cases. Thus, the city of Toronto has one hundred beds for the advanced cases which are always the most dangerous owing to the contagion they spread around them in poor families living in crowded houses. Ottawa has a hospital with forty-five beds for such cases; Hamilton has twenty-five beds. Our neighbours have also thought of the children, who have their hospitals in Toronto and their vacation colony at Lakeside Home. Ladies also organize committees for the relief and supervision of patients coming from sanatoriums. The anti-tuberculosis armament of the province is thus well understood and fairly complete, all that remains to be done is to extend it. This has been realized by the Canadian Association for the Prevention of Tuberculosis, which have instructed their secretary, Dr Geo. Porter, of Toronto, to promote the formation of new leagues, to bring them together in conventions every year, to spread anti-tuberculosis education in all towns and villages, to co-ordinate all the forces.

If we compare what the province of Quebec has done with what has been done in that of Ontario, we must admit that we are far behind. Our neighbours have eleven sanatoriums, five hundred and fifty beds, four dispensaries, seventeen leagues or associations and thirty-six affiliated branches.

We have two sanatoriums, one dispensary, four leagues, two hundred and twenty beds. In this connection it should be noted that nearly all the anti-tuberculosis leagues instituted in our Province have been inspired and organized by our English speaking fellow-citizens, although the great majority of the sick treated in these institutions are French-Canadians.

The Province of Quebec has, therefore a whole organization to effect and, without servile imitation, it may receive inspiration from the institutions of the adjacent provinces. Thus, for instances, we see in Ontario, a city and the county in which it is situated uniting together to build and maintain a sanatorium or an isolation hospital. As regards the isolation of poor consumptives in an advanced state, we may perhaps derive inspiration from what our countrymen of British Columbia, Alberta and Saskatchewan are doing ; they compel their general hospitals receiving provincial or municipal aid, to admit such patients in special pavillions. Tuberculosis is a contagious disease, it is true, but its contagiousness is more easily controlled than that of other contagious diseases. We might, as in Newfoundland, bring all the teachers of a city, county or district together and instruct them about tuberculosis once a year.

To promote the formation of new leagues, to bring them together in conventions, to co-ordinate all efforts, it would be advisable to imitate the action of the Canadian Association for the Prevention of Tuberculosis who have instructed Dr Porter, their secretary, to carry out such work of education, incitement and co-ordination, and that association, being a national body, are equally willing to co-operate with the Quebec Government and municipal authorities.

II

PLAN OF THE ANTI-TUBERCULOSIS CAMPAIGN OF THE CITY OF NEW YORK

According to Dr. Herman Biggs, the head of the official staff of the Health Department, the anti-tuberculosis organization of the city of New York, which goes back as far the year 1894, is considered a model one to be followed by all large cities. The basis of the organization is the fact, now admitted by all medical authorities, that tuberculosis is a communicable infectious disease and this being admitted, the Health Authorities should take preventive measures against it. Nevertheless, although this was scientifically established, it was necessary to begin with a campaign of general education. The Board of Health began by exacting the declaration of cases of tuberculosis from hospitals and other public institutions. At first compulsory declaration was not imposed upon the medical profession, but they were asked for a voluntary declaration and, as an inducement for such declaration, the Board of Health established a laboratory for the examination free of charge of the sputa specimens sent by physicians, exacting merely the names and addresses of the patients. After a while, it was realized that the action of the Board of Health in nowise infringed upon the rights of the medical profession, or of the patients treated. When the people were educated on this point, the Board of Health, in 1897, compelled all physicians to declare every case of tuberculosis. After that, the real organization began and it is how looked upon as the most complete in existence. It may be summed up as follows:

1.—**Compulsory declaration of tuberculosis.** This is essential and constitutes the very basis of the plan. The cases reported are divided into two groups: those which are reported by the attending physicians and those reported by other persons connected with any institution. If the consumptive is under the regular care of a private physician, and if the latter undertakes to have all the necessary precautions taken for preventing the transmission of the disease, the Board of Health does not interfere. The very fact of the attending physician having reported the case is considered a guarantee that the physician will perform his social duty. If however, the consumptive has no home or if he lives in a miserable room or in a house with several lodgings and has no private physician, or if the patient is treated in a dispensary or other public institution, then the Board of Health intervenes to protect society.

2. — **Examination of sputa free of charge.** To aid the early diagnosis of tuberculosis and as an inducement for declarations, it has been found, in New York, that a great many physicians who, at first, objected to declaring their cases, have become eager to avail themselves of the advantages offered by the Municipal Laboratory and thus declare the names and addresses of their patients. To facilitate matters, the Board of Health has established in various drug stores, depots of bottles, cards and other necessary articles for such examinations; these are first given to the physicians and are afterwards collected by the messengers of the Board of Health.

3. — Free **disinfection** by the Health Authorities of the rooms or apartments which consumptives have left. Sometimes, complete renovation of the apartment is ordered. If any infected articles cannot be properly disinfected, they are destroyed.

4. — **Persons suffering from pulmonary tuberculosis, who are not under the care of a private physician are visited in their homes by a certificated nurse,** who gives them verbal instructions, distributes documents printed in the patient's language, and takes note of the patient's social condition and of the hygienic state of his dwelling. The case may also be visited by an inspecting physician for the purpose of ascertaining whether the patient can be left at home or should be sent to a hospital or sanatorium. If he is a manifest source of danger to others, he must be removed from his surroundings even by force if necessary.

5. — **When, for one reason or another, it is neither possible nor desirable to thus remove a patient who is not under the care of a private physician, he is regularly visited by a nurse or physician.**

6.—**Relief** is given to consumptives and to their families. Milk and eggs are distributed in the dispensaries. **The charitable institutions are in communication with the Board of Health for relieving such patients.**

7.—**The Health Authorities of the city of New York have three classes of institutions for consumptives:** (a) **dispensaries** which take care of cases that can move about. Patients who cannot go regularly to the consulting rooms of the dispensaries are visited by nurses. In the dispensaries also, the physicians select the patients to be sent to the sanatoriums or to the hospitals. (b) **The hospital for advanced cases.** At least one hospital or one pavillion of a hospital should be under the exclusive control of the Board of Health for the isolation of urgent cases when necessary. Moreover, sufficient provision must be made for the isolation of indigent patients who cannot be properly cared for at home. (c) **A sanatorium.** The city of New York has a sanatorium where curable cases are treated free of charge. That sanatorium is on the model of a mere hut and the work is almost exclusively done by the patients themselves. The proportion of non-tuberculous persons employed is only about one to ten. The management, while effective, is at the same time economical. (d) **Educational measures.** These are of the **greatest** importance. The city of New York had to face a special difficulty in connection with this owing to the cosmopolitan and polyglot nature of its population. It was obliged to have its circulars printed in many languages, to the number of hundreds of thousand of copies, and distributed among the various nationalities composing its immense population. The press is called upon to assist in the movement of popular education; exhibitions are held; lectures with illuminated views are given, while the education department gives its help through lectures in the schools.

9.—The Health Authorities adopted regulations for public institutions in connection with consumptives.

10.—**Regulations,** sometimes sanctionned, have been enacted **forbidding expectoration in public places.**

This has had the marked effect of diminishing that filthy habit and of educating the people as to danger from expectoration.

11.—**Inspection of tenants of apartment houses** and house to house visits in poor quarters. A great many cases of tuberculosis are thus discovered. This is absolutely necessary in a large city.

12.—The other complementary measures are:

(a). **A half yearly census of the number of beds** available for consumptives and of the number of cases under treatment at the time in the institutions of the city.

(b). **A circular letter to physicians** once a year asking them for information respecting patients previously declared by them, so as to ascertain what has become of them.

(c). **Supplying sputum boxes** to indigent patients and to various institutions which distribute them.

(d). Supplying a large number of circulars printed in various languages to institutions which can distribute them advisedly to labour associations.

(e). **Supplying the education department with clear and concise circulars** for distribution among the pupils.

(f). **Recording on large wall charts the number of cases of tuberculosis per house.** By this means, the health authorities can become aware of infection centres.

(g). **Condemning, expropriating and converting into public parks,** the sections of a ward covered with houses recognized as hot-beds of tuberculosis.

This plan of campaign against tuberculosis although it may appear complicated at first sight, is realizable because it is in operation in New York and has reduced the mortality from tuberculosis 44 per cent in 22 years notwithstanding the growth and the cosmopolitanism of the population. The great majority of the physicians are working with the Health Authorities. The plan will be more easily carried out elsewhere where the same unfavourable conditions do not exist that are found in the large cosmopolitain American city. The plan brings out clearly the chief weapons of the anti-tuberculosis armament, their relative importance and the necessity of co-ordination by a single authority.

III

PLAN OF THE ANTI-TUBERCULOSIS CAMPAIGN IN EDINBURGH.

According to Dr. R. W. Philip, the originator and head of the movement, to extirpate tuberculosis, and to that end all collective efforts should tend, a plan of campaign is necessary, a plan properly co-ordinating all social forces with a thorough understanding of all the aspects of the question.

Notification.

The first thing necessary is to know the numer of cases and their distribution and this is possible only through a compulsory notification. Such notification is no less in the interest of the individual than in that of society; for it is only through knowledge of the precise facts that one can show the influence of social life on the progress of tuberculosis and thereby secure the action of the public authorities for the relief of indigent consumptives.

After notification

But notification is not all. It is merely a beginning and indicates where action must be directed. As tuberculosis, however, differs from other contagious diseases, in so far that it conceals itself a long while behind false appearances, to put off notification until the disease reaches the period when it shows too manifestly, means waiting too long and it is advisable that all measures be taken that will permit of its discovery at an early stage, either in the interest of the patient who has greater chances of being cured or in the interest of the community which will have fewer infecting patients. The dispensary is of the greatest importance in connection with the discovery of tuberculosis at the earliest possible date.

The dispensary.

The treatment of patients is but one of the many duties of the dispensary. It is also a preventive institution, in the first place through the selection of curable cases to be sent to a sanatorium and of the advanced cases to be isolated in a special hospital or pavillion and thereby prevented from spreading contagion in their families. Then, the dispensary deals not only with the sick themslves, but also with their social condition and the hygiene of their dwellings. By visiting the patients in their houses, the nurse or visiting physician discovers other cases of tuberculosis in the family and teaches them the necessary preventive measures. Finally, it is a centre of valuable information for the Health Authorities. As Dr. Philip says, the dispensary is the information bureau or clearing house in connection with every anti-tuberculosis organization. The dispensary would lose nearly all its value if it were a completely isolated institution and not in close touch with the isolation hospital, the sanatorium, the farming colony and the Board of Health.

Thus the dispensary is the chief weapon of the anti-tuberculosis armament, because, in the first place, it attracts a great many consumptives of the poorer classes and thereby reveals cases beyond number which would not have been reported to the health authorities; then because the dispensary is the place where it is decided what is the proper thing to do with individual patients. As Dr. Philip says, the dispensary performs two important duties from the standpoint of prevention: it is a collection bureau and a distribution bureau.

Programme of the Victoria Dispensary

1.—Receiving and examining patients; recording all cases with notes as to the history of the disease, present condition and manner of living of the patients.

2.—Bacteriological examination of the sputa and other excretions.

3.—Instructions to the patients respecting treatment and the means to be taken to reduce to a minimum the danger of infection for the other members of the family.

4.—Supplying the necessary medicines, spittoons, disinfectants and sometimes food when the patients' poverty makes it necessary.

5.—Visiting the patients in their homes: (1) by a qualified physician and (2) by an experienced nurse with the twofold object (a) of treatment. (b) of inquiry into the hygienic state of the dwelling and general conditions of existence and the risk of infection for others.

6.—The selection of the patients who should be sent either to a sanatorium or to a hospital and the supervision of the patients when they come out of such institutions.

7.—Giving directions to consumptives and to their relatives or friends and answering all questions by persons interested in tuberculosis.

8.—Working in direct association with the Board of Health, receiving and giving information regarding tuberculosis morbidity and mortality, visiting and aiding cases notified to the city authorities.

Home Investigations

It is easy to realize the importance of the dispensary and its undeniable superiority over other institutions, sanatoriums or hospitals, from the fact that it discovers more patients and watches over them even at home as long as it is necessary. Particular attention is paid to the examination of the patient's relatives who manifest any indication of tuberculosis and thus a great many cases are found out early enough to allow of their being cured and prevented from becoming infectious.

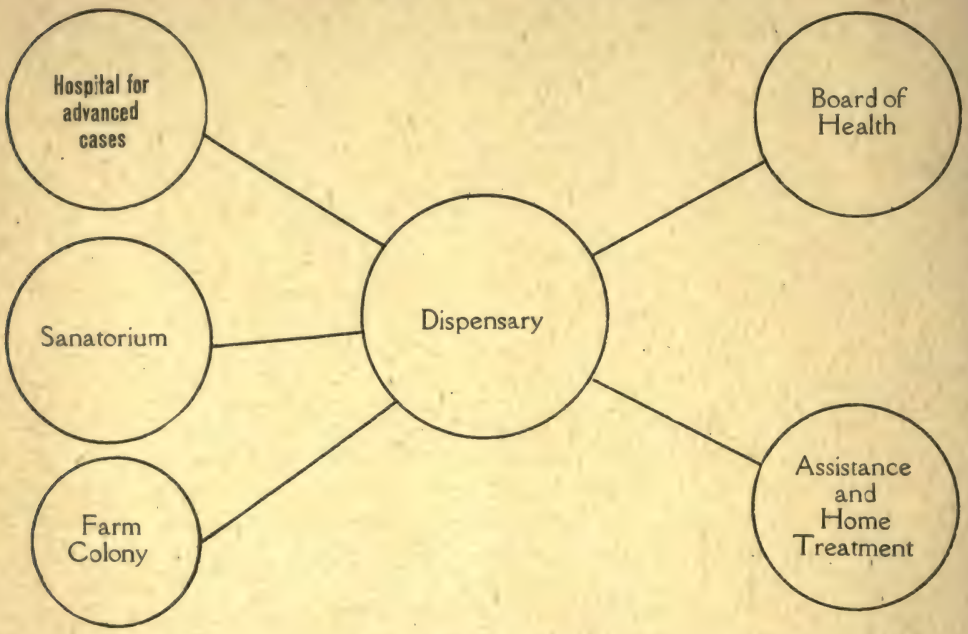
Systematic visits to the patients' homes also have another great advantage ; they keep the Board of Health informed as to changes of residence. The experience in Edinburgh is that 41 per cent of the patients change their residence in two years and thus multiply hot-beds of infection.

Relations of the dispensary with other institutions.

The dispensary is the place where the curable and incurable cases are picked out which are to be sent either to a sanatorium or to a hospital, where supervision over those who come out of such institutions is organized ; where the relief provided by various charitable institutions is distributed; where information is gathered which is of interest to the Board of Health. Thus the dispensary is the central link of the chain that binds together all the institutions whose object is the treatment or the relief of consumptives.

Co-ordination of means.

The dispensary should therefore be the central point of all searches and directions in everything connected with the campaign against tuberculosis. Thus :



RESULTS

Since the foundation of the Victoria Dispensary for Consumptives, in 1887, the mortality from tuberculosis has constantly decreased in the city of Edinburgh. Thus, from 1887 to 1896, the decrease was 12.82 p. c.; but from 1897 to 1906 it has been 42.1 p. c., whereas in London, where the anti-tuberculosis campaign was not carried on through the dispensary and its satellites, but merely by the improvement of dwellings and urban surroundings, the decrease from 1887 to 1896 was only 5.5 p. c. and from 1897 to 1906, 17.65 p. c.

This shows that success depends upon thorough organization and upon perseverance in the fight because it is in the second decade that the results become really apparent.

"Class Method."

This is a method of treatment according to a sanatorial system, but is carried on at home, and **its results are comparable to those of the sanatoriums, but with much less expense and irksomeness.** Dr. Joseph Pratt, of Boston, invented this excellent method. It is as follows : The managing staff consists of a physician and a nurse. The expenses are paid by a charitable association. The organization of the class is effected thus: the

physician selects from 10 to 15 curable consumptives, gives them a thermometer, shows them how to take their temperature, gives them a memorandum book in which they are to note down the progress of the fever, the number of hours passed in the open air, the quantity of food taken and other remarks. Patients with fever undergo a rest cure and an open air cure before coming to the weekly meetings. They are visited daily by the nurse who gives them the necessary instructions and sees that they are carried out, for patients are accepted solely on the condition that they submit to the discipline imposed and continue their treatment as long as may be necessary, generally six months. Once a week, the whole class meets: 1. So that the physician may ascertain the condition of each patient by comparing from week to week the weight, temperature and local and general improvement, and be able to give each one the proper instructions ; 2. So that the improvement in the one may serve as encouragement to the others, as in sanatoriums. Thus, emulation and beneficent brotherhood are established among the members of the class. The remarkable improvement in some members induces the others to faithfully imitate them in carrying out the treatment. If a patient is too careless, his name is struck from the class list. The home treatment consists thus in **rest cure, the open air cure and the food cure.** Rest must be absolute, especially at the beginning, to secure recuperation of strength and the disappearance of fever. The open air cure must be continual, the patient must go indoors only for his meals and must consequently be in the open-air from twenty to twenty-two hours out of the twenty-four. To that end, he takes the same precautions as at a sanatorium; woollen clothing, artificial heat to his feet, a tent, etc. The cure is carried on either on a gallery, in the yard or on a roof. As to food, it must be generous with the addition of milk and eggs, but in proportion to the patient's appetite. The results of this method are excellent and can even compare with those of the sanatoriums where moreover, the air does nothing more. In fact, the patients gain one, two and even three pounds in weight per week, according to the experience of this method, in Montreal, by Drs. E. S. Harding and Campbell Howard. The method has also the advantage of being less expensive than treatment in a sanatorium. The latter costs at least one dollar a day or $180.00 for six months. Now, treatment by the class method has cost only $57.90 per head for twelve months, say $1100.00 for a class of 19 patients under the direction of Dr E. S. Harding and $100 per head, say $1200.00 for a class of twelve patients under Dr Howard, and only $28.95 and $50.00 if we take six months only. Hitherto, the physicians have charged nothing for their time and the foregoing amounts represent only what was paid the nurse and the expense of aiding the patients. If we consider the excellence of the results which can almost be compared with that of the sanatorium, the economical side of the method as well as its sentimental side, for this treatment permits of the patient's remaining with their families, it may be said that this method of treatment will certainly be

of greater importance in the future than the sanatorium because it has all the advantages of the sanatorial method without the drawbacks.

THE PROTECTION OF CHILDREN IN GERMANY.

In Germany the most intense efforts are directed towards the protection of factory operatives, of children and adolescents.

Hygiene of Mothers

The State protects the child even before birth by protecting the mother through special legislation. (law respecting the Imperial Insurance of Workmen). This law empowers the local authorities to secure to workwomen a compensation for the loss of six weeks work previous to childbirth, the services of a midwife and even of a physician if necessary. Another law forbids a woman who has been confined to work during the four weeks following her confinement and during the two next weeks, unless she has a medical certificate. This law applies to all women whether married or unmarried. The law respecting insurance against sickness thus allows a woman to remain six weeks after the confinement without working.

Protection to the Child's Life.

To protect the child's life by means of proper hygiene and a good start in life, means to protect it from tuberculosis. To encourage mothers to nurse their children there are prizes for suckling and special rooms in factories where mothers can nurse their babies. In connection with artificial feeding, pure milk is secured at a moderate price. The regulations against adulteration of milk are very severe. All children lacking care from their parents are under the care of the State, which has, since 1906, created a special department for the purpose. (Merufs Vormundschaft—State Guardianship).

Supervision of the School Child.

The school period is one of great danger for the child. Kirchner has demonstrated that if the general mortality in Prussia has diminished from 1876 to 1903, the mortality of school children from tuberculosis between four and fifteen years of age has increased. **Medical inspection of the schools is considered of the highest importance.** Special importance is attached to three points : 1. daily sweeping with damp brooms ; 2. prohibition of spitting on the floor ; 3. the examination of every teacher manifesting symptoms of tuberculosis, such as emaciation, paleness, lassitude or cough and his removal if the tuberculosis bacillus be found. Philanthropic associations and municipalities furnish dinner at school to children who are predisposed to tuberculosis and who are poor.

Medical Attendance.

The children of poor parents are visited and attended by physicians under one of the poor laws.

Dental Clinics in Schools.

Observation has shown that decay of the teeth is exceedingly frequent among children and the bad condition of the teeth contributes to their denutrition and weakening. In the year 1906 over 18,000 children were treated in the department of Dental Clinics for school children in the City of Strasburgh.

Sanatoriums for Children

At present, there are in Germany 18 sanatoriums with 837 beds for children. But, there are 100 other institutions receiving children who are delicate, predisposed to tuberculosis or scrofulous. The Imperial Insurance System provides the funds for such institutions.

Forest Schools.

Forest schools are a truly German invention. Great importance is attached to them, in connection with increasing the vitality and resistance of debilitated city children. All that is done to restore the children's health is a practical lesson for them and they thus acquire the habit of leading a healthy life. Much importance is attached to hydrotherapy.

Forest Camps.

At present there are only three large forest schools. But there are nineteen forest camps where, without the complete school organization, a certain amount of instruction is nevertheless given. The children come in the morning, get their meals and plenty of milk and return home at night. Adults have eighty-two of such forest camps. Lectures are given in the open air. But as amusement is also provided, those institutions are very popular.

Vacation Colonies.

There are seventy-nine philanthropic societies which send children, in groups of twenty-five or thirty, to country places where they recuperate the strength they have lost in the cities.

Care after Vacations

Children who have thus been sent to the country during the summer are afterwards kept under observation, so that they may not lose the benefits they have gained. A special organization looks after those children and commends them to the relief associations. In Hamburg such supervision is exercised by the municipal charitable organizations.

PROTECTION OF CHILDREN IN FRANCE

Professor Grancher's work for the protection of children. Professor Grancher's work cannot be better explained than in his own words.

"When tuberculosis exists in a small lodging and attacks the father or the mother, contagion of the children is almost sure, and I have thought that the

best way to fight tuberculosis was to remove its prey. In such a family, the organization takes away the children between three and ten years of age who are still healthy and puts them in the country with peasant families who are also healthy and where our wards spend the whole of their school life until they are thirteen years old and even longer, because we are sure that many will remain in the country and found peasant families. The wards are entrusted to excellent country physicians who choose the peasants' houses and attend the children free of charge.

"**From the medical standpoint**, this is a complete and radical solution. In fact it removes all the causes of tuberculosis ; the remote causes, such as unhealthy lodgings, and the misery of large cities which prepare the soil, and the immediate cause, family contagion. **From the social standpoint,** the child is removed from the promiscuousness of lodgings infected by tuberculosis and placed during a lengthy period of his life in a good home, leads an open air life, with abundant food, becomes a new being, physically and morally. He reaches adolescence full of vigour and can then choose between life in the fields and the return to the city. Finally, the preservation of such children fated to become victims of tuberculosis if they had remained in Paris with their families, will for the future, remove so many sources of contagion and gradually diminish the field of tuberculosis."

And Professor Grancher completing his words by deeds, founded his organization by means of a personal donation of 130,000 francs ($26,000.00). To this foundation were added donations from the state, from the city of Paris, from the Messrs. Rothschild (50,000 francs) the proceeds of a charity sale organized by lady patronesses, (66,000 francs) from the students of the Parisian Lyceums who maintained 70 children at their expense.

A word now as to the working of "l'Oeuvre de la préservation de l'Enfance." The President of the Organization at the present moment is the eminent Dr Roux, director of the Pasteur Institute. An association of lady patronesses seek all the children to be saved; those they find are thoroughly examined by physicians because contagion must not be carried elsewhere by them. Once selected and the place in the country found by the local physicians, a lady patroness takes the child there. The families with whom children are placed are carefully chosen by the physicians affiliated with the organization. They are chiefly families without children because they become more attached to their wards. The organization gives twenty francs or more pe rmonth. The country physicians see the children at least once a month when they go to pay the monthly allowance. A general inspection is made every year. The physical and moral transformation is very great. The general administration of the work costs very little; modest premises and a couple of employees are all that is needed. The entire maintenance of a child, even if it costs four hundred francs, is still a very slight expense compared to that of a tuberculous adult in a sanatorium. The difference is still greater as regards the result, for in the first case, complete and radical preservation

has been effected while in the second case a comparative cure at most is obtained in some instances or the issue has merely been delayed. The work is assuredly one of general inspiration because it has not only a medical and social import, but also a patriotic one. Thus, France is covered with affiliated associations, at Lyons, Lille, Hâvre, Bordeaux, Marseilles, Rennes, Montpelier, Tours, Toulouse, Dijon. "For one franc ten centimes per day and per ward, it saves a child from tuberculosis ; frees from a crushing burden a family exhausted by the disease and at the end of its resources; saves heavy expenses ; prevents fresh contagion ; relieves the overcrowded cities for the benefit of the too deserted country parts; gives the country vigorous soldiers and strong workmen. This should win the generous sympathy of the happy ones in the world and the formal support of those who are charged with the safety and well being of the country" (Dr. P. Armand Delile, General Secretary.)

Maritime Hospital at Berck-sur-Mer.

Children who are scrofulous and afflicted with surgical tuberculosis are sent to the Maritime Hospital at Berck-sur-Mer, because the climate of the sea-shore is specially suited for such cases. The City of Paris has two large hospitals : Bonneville and Parmentier, the former with three hundred beds for boys and the latter with three hundred beds for girls. About two thousand children go through those two institutions every year.

PROTECTION OF CHILDREN IN AMERICA.

Americans protect children : 1. By medical inspection of schools ; 2. by open-air schools for tuberculosis children ; 3. by play-grounds.

Medical Inspection of Schools.

This is very widespread in the United States and is very well carried out with a thorough understanding between the Board of Health and the education department. Credit is due to the City of Boston for having given the example, a model example.

Open-Air Schools.

In this the Americans have merely imitated the Germans. They are carried on as follows in Boston, whence we have obtained the best information. The first open-air school was inaugurated in Boston by the association for the Relief and Control of Tuberculosis. The results were so encouraging that the Boston School Committee also established an open-air school at Franklin Park. Class is taught under a tent on the roof of a house in the city. The tent is twenty-five x thirty x fifteen feet and under it are some twenty desks. Before going up to the class, the children find in the house a kitchen, dining room, toilet room, a resting room and a cloak-room containing bags and special clothing against cold. They come at 8.30 and

breakfast. Four of them remain in the dining room to clear the table. The period between breakfast and dinner is devoted entirely to school, with exercise at intervals, work lasting only twenty minutes at a time. At 12.30, dinner followed by rest or sleep for an hour. Class re-opens after that rest. At 4.30 they are given a side meal and at five the children return home. Cleanliness is strictly insisted upon, face and hands must be washed before each meal, and the teeth are washed and brushed after each meal. In addition to the free meals given at school the children must have at home bread and milk or milk with porridge of some kind, or an egg before leaving their homes in the morning and in the evening a light collation after they return. The children are weighed and their temperature is taken every day. They are encouraged to take a cold shower bath every morning. They have a medical inspection once a week. If they are discharged from the school on account of their health they are visited at home by a nurse. And as the children's health depends also upon the hygienic conditions of the family, an experienced person is sent to teach domestic hygiene to the pupil's family. The results have been excellent from the medical standpoint. Out of the first thirty-one children who attended the open-air schools, seventeen went back to the ordinary schools with their tuberculosis arrested and without losing their school degrees. No information could be obtained regarding the six others as they left the school and the city.

In Bradford, England, it has been found by examination of the blood with the haemoglobinometer that the proportion of haemoglobin is remarkably increased, that general nutrition is improved and weight and chest measurement increased.

The results are no less satisfactory from the educational standpoint. The children improve, not only physically but also mentally. The results in every respect are so striking that applications are made by a great many parents for the admission of their children to these open air schools. So advantagous are the latter considered, that the parents even offer to pay for admission.

There is also a real gain from the economical standpoint, because the money spent in saving a child from tuberculosis and teaching him hygienic habits is infinitely better employed than in maintaining other costly institutions for a treatment of adult patients

The open air school should not be reserved exclusively for confirmed tuberculous children, but also for predisposed delicate, anaemic, scrofulous and rachitic children. About 5 per cent of the children in the schools of large cities are in such a condition as to be in urgent need of the open air school. In a more or less remote future, the school surroundings should resemble the outward surroundings for pupils, so great is the hygienic effect of foul air in the present schools and so extensively has experience demonstrated the superiority of the open air school in every respect. It is perhaps not necessary to have class on the school roof to have the benefit of pure air ; it is

probable that the mere opening of the windows in our present schools would meet the object in view. And as, according to the opinion of some experts, five per cent. of the children are in urgent need of that system, this means that, in every district, one school in twenty would have to be converted into an open-air school. It is more economical to concentrate the children in one large school than to have too many small open air schools. The tramway companies should give reduced fares or passes to such children who are obliged to go a long distance to get to such schools.

Play Grounds in Cities

Modern civilization increases immoderately the population of cities. Density of population leads to building very high houses, to crowding them together and to overfilling them; the result is that residents of cities lack air and sunlight, two essential elements of health. The child who breathes vitiated air all day at school, continues to breathe vitiated air when he returns home. If he wants to play, in the streets, he also breathes foul air and bacilliferous dust, besides being exposed to many dangers. In view of such alarming conditions, a reaction has begun in the United States and a very extensive association, the Playgrounds Association of America, was formed three years ago. Its object is to make the councils of large cities realize the dangers of the modern city and to show them that the money spent in preserving the citizens' health is money well spent. That association has held two conventions with the result that the attention of the large American cities has been called to these important questions. At one of those conventions, held in New-York, one of the leading members of the association said, in presence of the State authorities : "**A playground without a school is better than a school without a playground.**" Words which clearly show the importance attached to the question.

Now barely two years after that convention, Chicago, New York, Boston, Washington, Philadelphia, Baltimore, Pittsburg and other large American cities have playgrounds and many of them. Thus, if, in New York, where land is so dear, there are only eleven playgrounds, on the other hand Boston has fifty-four and Chicago two hundred and ninety-nine. Their usecefulness must be incontestable, because the sums spent in establishing such playgrounds are very great. Thus Boston has spent $2,600,000.00 and Chicago $9,000,000.00. This expenditure includes the purchase of the grounds and the erection of complete gymnasiums. There is also a yearly expenditure of $90,000 for keepers' wages, for maintenance and improvement.

The greatness of the sum spent for playgrounds in Chicago, will be realized when one learns that they are not mere parks, but are provided with gymnasiums, both under cover and in the open air, so that every imaginable kind of game or sport may be indulged in. There are even swimming baths, shower baths, a library and a large staff of servants, attendants and instructors. To show the attraction those play grounds have for the

people, it may be said that during three months only of last winter : December, January and February, at the South Park Gymnasium, 11,819 entries were registered. viz. : 7,289 boys and men and 4,503 girls and women. The idea of the playgrounds in Chicago is much broader than here; for in the Metropolis of the west, the playground is a complete gymnasium and many are needed to enable the majority of the population to counteract by gymnastics in the open air, the baleful influences of urban life. And citizens of that great city seem convinced that the expenditure in money, — great as it is, — yields a heavy profit through the hygienic habits acquired by the population, the extra strength resulting from them and the consequent improvement in moral tone.

THE PROBLEM OF UNHEALTHY DWELLINGS.

Unhealthy dwellings are the hot-beds of tuberculosis and other contagious diseases. They cause human beings to wither, retain the morbid germ and facilitate its transmission. The dwelling problem is a modern one, because manufacturing cities have been invaded by too intensive immigration and the consequences of this are the overcrowding of houses and the increase in the number of the wretched. This is a social problem which all social forces should strive to solve. The public authorities, the State and municipalities should lend their aid to philanthropy and to groups of individuals. But the principle of interest should be the basis of all action. The public authorities should enact laws authorizing certain loans and financial transactions within certain limits ; they should likewise furnish by means of loans, the money required for their undertakings to associations incorporated under such laws. The efforts of philanthrophy alone will never be otherwise than spasmodic. To obtain tangible and lasting results the interest of individuals and associations must be aroused and maintained. Considerable efforts have already been made within the past thirty years to find a solution of this distressing problem in Germany, France, Belgium, England and the United States. Investigation into what has been done in those countries shows that the efforts made to improve the dwellings of the working classes had results which, if not complete, are still encouraging. And if the results are not complete, if something remains yet to be done, it is because the efforts have not been general and because immigration, ever advancing like a rising tide, generates the same conditions over again. But this should not discourage us because, even under such conditions, the improvement of dwellings in large cities has had a very marked result.

In Germany

The law anticipates and controls the reserving of extensive lands for speculative purposes, which increases their value and thereby raises rents. Vacant lots are taxed to compel owners to build houses on them. Village

municipalities acquire large areas of land in their limits to prevent excessive rise in value for the benefit of the few and to the detriment of the many.

Co-operative information and building associations are numerous.

The compulsory Imperial Insurance for workmen and employees lends much money at very moderate rates, from three to four per cent, for the erection of hygienic buildings.

Some municipalities also, such as Frankfort and Nuremburgh, aid associations for the erection of hygienic buildings by means of long term loans at from 3.5 p. c. to 4 p. c. Prizes are also given for the building of cheap and healthy houses.

In order to prevent the depopulation of the country parts, aid is given to peasants towards building houses.

Societies see to decentralizing the urban population by obtaining from municipalities easy means of transportation, and reduced tariffs of rates for the conveyance of the working classes.

Krupp's celebrated works, where 30,000 individuals are employed, have erected from 4,000 to 5,000 hygienic dwellings, leasing them at exceedingly low rates with the option of purchase on the rental instalment plan.

In Frankfort, 3,000 houses for the working classes have been built through the co-operation of builders, of building societies and of the municipality.

The State itself has aided private enterprise by establishing banks to loan money on the security of real estate or by advancing money itself. Thus, in 1904, the Government of Bavaria advanced 1,300,000 marks to the authorities in connection with building societies. In the Grand Duchy of Baden, the State encourages the building of houses for workmen by means of an advance of 70 p. c. on the cost.

In France.

In France we also find the association of individual and co-operative efforts by building societies with state aid. From 1851 to 1871, at the instigation of Baron Haussmann, the French Government gave 48 millions of francs for rebuilding a portion of Paris. The Government has also dealt with the housing question by appointing a Superior Council for cheap dwellings under the control of the Minister of Trade. The law authorizes savings banks to advance money to building societies to erect cheap and healthy dwellings. In 1902 the latter reported that they had loaned 19 millions of francs. From the report for 1904 it appears that 14 millions of francs were loaned by 66 societies. Those cheap building societies are very numerous in France. The law forbids their paying a dividend exceeding four per cent, to prevent speculation and the raising of rents. The law of 1894 exempts such societies from certain taxes. In return, the societies help the public authorities by keeping such dwellings healthy and by making enquiries in connection with public health.

In Belgium.

Still greater progress has been made in Belgium. As early as 1837 that country had caused an inquiry to be held into the condition of workmens' dwellings. In 1884, the Belgian Government had a technical exhibition of workmens' dwellings, and in 1852, the Superior Board of Public Health distributed the plans from such an exhibition free of charge. In 1861, a law authorized a company at Verviers to build houses for workmen. In 1889 a law was passed to incite municipalities to provide cheap and healthy dwellings for workmen. The National Savings Bank under Government control, lends money to building societies. On the 31st of December 1900, it had aided 140 of such societies by advances amounting to 37,225,000 francs. This enabled 17,000 workmen to live in healthy houses. The most important of the Belgian societies are "Les Sociétés de Crédit," "Les Sociétés Immobilières." In August 1902, the various societies had lent 41,000,000 francs to 106 joint stock companies and 2½ millions to aid co-operative societies. At the same time the "Société Immobilière" lent 2,025,000 francs to 33 joint stock companies and 66,500 to a co-operative society.

There are also in Belgium, Bureaux de Bienfaisance, "Benefit Associations", which lend money for building cheap, healthy houses for the working classes. In 1889, 21 of such associations lent 7,000,000 francs. The number of societies in Belgium whose object is to build workmens' dwellings is so great that a list of them fills 68 double column pages in Mr. Lucien Hochsteyn's pamphlet.

In Belgium also, exemption from taxation is granted to encourage workmen to become house owners. Thus, the Belgian Parliament by exemption from taxation to the amount of 65,000,000 francs enabled 55,000 houses to be built which are owned by workmen.

In England.

As early as 1851, the British Parliament dealt with the question of unhealthy dwellings in connection with public health and improving morals, by forbidding "back to back houses," cellar tenements, and laying down certain sanitary principles upon which new cottage dwellings could be erected. This legislation was not without effect. Effective legislation was secured through the passing in 1890 of the Housing of the working-classes Act, which was amended in 1894 and in 1900. This Act gives power to expropriate an unhealthy house or block of houses. At first the carrying out of the act was entrusted to the local councils and to the department of public works. But experience proved that the law could not thus be easily and effectively carried out, so it was entrusted to the county councils and the results have been excellent. Therefore, the duty of making inquiry about unhealthy dwellings and of carrying out the law devolves upon the municipal health authorities. When the health inspectors report unhealthy houses to the municipal authorities, the latter inform the Secretary

of State and submit their propositions to him. If the property to be expropriated is extensive, Parliament is sometimes consulted. The compensation for expropriation is based not on the actual rent but on the normal rental value.

As to the value of dwellings condemned as uninhabitable, the municipality pays only for the ground and the materials. If the house is only in bad order and can be inhabited after being repaired, the amount needed for repairs is deducted from the purchase price. The county council collects from the tenants only a rent sufficient to pay in the first place the interest at 3 p. c. which it hands over to its lender and afterwards the sinking fund of the principal and cost. It will readily be understood, that under such circumstances, the county council has done more effective work, than the societies which have to pay a dividend of 5 p. c. to their shareholders. Nevertheless the societies for building cheap houses are very numerous ; there are 2,700 of them in England. Fifty years ago the housing of the poor was the great question with Englishmen. To-day it is the housing of the working classes. The efforts made in England for the improvement of dwellings have had a very marked result, not only as regards public health, since there has been a decrease of mortality from tuberculosis of nearly fifty per cent, which cannot be attributed to anything else, but also on the moral tone of the lower classes. Thus, in Liverpool, where the greatest efforts have been made to produce healthy lodgings for the poor, the number of offences dropped within a given time from 264 to 96. Mortality from tuberculosis has been greatly influenced by the campaign against unhealthy dwellings, especially in Liverpool, as may be seen by the following table :—

Mortality from tuberculosis in Liverpool per 10,000 inhabitants :

1856 to 1865	1866 to 1867	1876 to 1885
350.7	333.9	255.3
1886 to 1895	1896 to 1905	1906 to 1907
212.9	182.7	162.7

As may be seen, the decrease in the mortality from tuberculosis since 1865 has been steady. Thus, it may be said that the city of Liverpool has wiped out 24,000 unhealthy dwellings, rebuilt streets, opened parks, constructed public baths, facilitated communications, etc. Further proof will be found in the fact that while the decrease is considerable in England and Wales, where dwellings have been improved, the mortality from tuberculosis remains high in Scotland and especially in Ireland, where almost nothing has been done for the improvement of human habitations. Thus, out of 10,000 inhabitants, England loses only 13.6 through tuberculosis ; Scotland loses 17.3 and Ireland 20.7. The English see to improve not only ordinary dwellings, but also workshops, factories, schools and to make streets, wards and the whole city healthy.

In AMERICA.—The City of New York.

The City of New York, owing to the density of its population and to cosmopolitan immigration, was the first American city to suffer from unhealthy dwellings. In 1876, steps were taken to provide workmen with better lodgings and a Mr. White built at first a block of houses for them on Hicks street and afterwards two others. Those blocks gave lodgings to 135 families or 539 persons in 1879. But as the movement against unhealthy dwellings did not make much headway and as the city's health was greatly endangered, the New York State Tenement Houses Commission was appointed in 1900. When it came to the conclusion that the excessive mortality among the lower classes was greatly due to unhealthy dwellings, the Tenement Houses Act was passed establishing the Tenement Houses Department in New York city. The most extended powers were given to that department. It was empowered, not only to compel people to leave unhealthy houses, but also to stop work on new buildings which were not in accordance with the municipal by-laws; to inspect two-thirds of the houses in the city; to exact names, addresses, and all necessary information from owners or their agents. With an amount of half a million dollars at its disposal and a staff of 400 employees, it made 82,000 inspections at the very outset The work of the department has been very effective. One unexpected result has been the suppression of prostitution in tenements. Another evil which the department suppressed has been corruption and inefficiency in the work of the Fire, Police, Building and Health departments. It has been a powerful aid to the Health Department, by supplying information concerning the sanitary condition of lodgings, the movement of contagious diseases, various orders and statistics. That department has also brought about the disappearance of the dumb-bell tenement.

Instead of causing disturbance in speculation in property, it, on the contrary, has caused a rise in value. Speculators no longer buy a house without ascertaining beforehand whether it is in accordance with the by-laws. It has even caused eagerness to remodel the old rooms, the more easily to attract tenants. This eagerness to improve lodgings has also incited philanthrophy to act, and Mr. Henry Phipps has given half a million dollars in trust, for the building of healthy tenements.

The City of Washington

The campaign against unhealthy dwellings has been carried on in New York, as we have just seen, by the organization of a special municipal department. In Washington this is done by a philanthropic association but on business principles, the Washington Sanitary Housing Company, which has undertaken to improve the dwellings of the poorer classes. It took for its object the building of cheap, healthy houses for workmen earning small wages and consequently able to pay only from eight to ten dollars a month. It has been in operation for about twelve years and the results have been

excellent from every standpoint. The mortality in the houses built by that company is considerably lower than that in other houses of the city. The people living in those clean and comfortable houses have become moral. Several tenants have become owners of their houses by paying a small monthly addition to the rent as a sinking fund. The results are encouraging from a pecuniary point of view. Although founded on philanthropic principles, the company gets a dividend of 5 p. c. on the capital invested. Since 1898 the date of its foundation, the company has paid that dividend of 5 p. c. and has even succeeded, while keeping the rent of its houses at the original rate, in getting a surplus which has been devoted to the erection of new buildings. Since its foundation, it has built 289 houses containing 578 tenements with three, four, or five rooms. Such an experience of a philanthropic association succeeding in earning a dividend of 5 p. c. and realizing a surplus, should tempt capitalists who, while wishing to derive a profit from their investment, have human feelings. The proof that the undertaking is not only philanthrophic but at the same time sufficiently profitable, is that even speculators have since built about 2000 houses like those of the company. A fuller description of the plan and its results is given in the address by General Sternberg, contained in the 10th annual report of the Canadian Association for the Prevention of Tuberculosis.

PROVINCE OF QUEBEC

Legislative Enactments concerning directly or indirectly the prevention of Tuberculosis.

(From the Quebec Public Health Act R.S. 1909 and the By-laws made thereunder.)

Notification

3917. Whenever the head of any household or of any establishment whatever ascertains that any person dwelling in his home or in the establishment under his control, has small-pox, asiatic cholera, plague, typhus, diphtheria, croup, scarlatina, typhoid fever, measles, **tuberculosis,** leprosy or any other disease which the Board of Health of the Province has designated by by-law, he shall within twenty-four hours notify the same to the municipal sanitary authority of the locality in which he resides or has his establishment. (Health Act).

3918. Any physician who ascertains that any person whom he is called upon to visit is infected with any of the diseases set forth in article 3917, shall, within twenty-four hours, give notice thereof to the municipal sanitary authority of the locality in which such diseased person may be. (Health Act).

Disinfection etc. of Infected Premises

25a. Any householder in whose household a death from **pulmonary tuberculosis** has occurred shall, within 48 hours from said death, notify the secretary-treasurer or the local Board of Health of the municipality in which the house is situated, and upon such notification the municipality shall cause to be disinfected the apartments which it will deem to have been contaminated by the patient. Unless more precise and reliable indication be given, will be considered contaminated the rooms the patient has occupied during his illness. (By-Laws).

25b. Whenever a person suffering from **tuberculosis** which has reached the stage of suppuration and expectoration (**open** tuberculosis) changes his residence, the householder of the premises which such person vacates shall notify the municipal sanitary authority previous to the projected removal, and after departure of the patient, the said municipal sanitary authority shall have the disinfection done of all apartments which it will consider having been contaminated by the patient. (By-Laws).

26a. It is forbidden to funeral undertakers or other persons to introduce draperies or other mourning ornaments or decorations into any house infected with small-pox, asiatic cholera, typhus, diphtheria, croup, scarlet fever, typhoid fever, **tuberculosis,** measles, whooping-cough, puerperal fever, erysipelas, cerebro-spinal meningitis, or any other contagious disease. (By-Laws).

Spitting Nuisance

25d. Whosoever shall spit on the sidewalks of streets, roads and public places, on the floor of any public building or vehicle or on the deck of any public boat, on the floor of any industrial establishment, workshop, educational institution, or any other establishments in which several persons congregate, shall be liable to a fine not exceeding five dollars for the first offence and to a fine not exceeding ten dollars for every subsequent offence. (By-Laws).

Foods

39a. The entire carcass and all organs of animals suffering from the following diseases cannot be used as food:.....

Tuberculosis in hogs, whether the lesions appear important or not;

Tuberculosis in all other animals; (a) when there is miliary tuberculosis of both lungs; (b) when tuberculous lesions are present on the pleura and peritoneum; (c) when tuberculous lesions are present in the muscular system or in the lymphatic glands, embedded in or between the muscles; (d) when tuberculous lesions exist in any part of an emaciated carcass.

If tuberculous lesions; (a) are confined to the lungs and thoracic lymphatic glands; (b) are confined to the liver; (c) are confined to the pharyngeal lymphatic glands; (d) are confined to a combination of the foregoing organs but are collectively small in extent, the carcass, if otherwise healthy, may be used as food after every part of it containing tuberculous lesions or being directly in contact with it (costal and abdominal walls) has been confiscated and destroyed. (By-Laws).

39r. No employer shall knowingly allow any person to work in his **bakeshop,** who is affected with **consumption of the lungs,** or with scrofulous diseases, or with any venereal diseases, or with any communicable skin affection, and every employer and his employees shall maintain themselves in a clean condition while engaged in the manufacture, handling or sale of such food products and this to the satisfaction of the municipal sanitary authority. (By-Laws).

49. Every owner of a **tuberculous cow** must at once notify the municipal sanitary authority of the fact. (By-Laws).

49a. **Tuberculous cows** shall be placed in a compartment completely separated from that occupied by the other animals and the sale of their milk is forbidden until a veterinary surgeon has given a written certificate that the udder is not attacked by the disease. Such certificate shall not be valid for more than three months at the most, unless it be renewed after an examination of the animal. For the purpose of the present by-law, in the absence of inspection by a veterinary surgeon, all cows that cough and become thin or have a disease of the udder shall be deemed to be tuberculous. Whenever the bacillus of tuberculosis will have been found in the milk of a cow, any certificate which might have been given by a veterinary surgeon will thereby be cancelled. (By-Laws).

Habitation, in General

40. In every house in which drains are made, the **soil pipe** must be carried above the roof. (By-Laws).

41. The **drain pipes** of a house shall be of iron or of varnished or glazed earthenware. The soil pipes shall be of iron, unless the Municipal Council allows them to be of lead, which is not however desirable. Wooden drains or pipes inside the house are strictly forbidden. (By-Laws).

42. The **pipes** connecting the water-closets, baths, basins or sinks with the soil pipes, shall be of metal and there must be a trap close to each water-closet, bath, basin or sink. All the joints shall be so made that neither water nor gas can escape. (By-Laws).

43. In all new buildings or in any buildings about to be remodelled the **water-closet** shall be placed in a room having a window opening directly into the external air whose glass area will not be less than one tenth of the area of the floor of the room. A skylight is admissible. The water-closet known as the pan-closet is forbidden to be put in all new buildings. (By-Laws).

43a. No dwelling house shall be erected on **lots where night-soil, garbage or street scrapings have been deposited,** unless the foundations are made with stone and rest on concrete, and, moreover, the soil of the cellars or subsoil of the buildings must be covered over with a layer of concrete of six inches at least in thickness. (By-Laws).

43b. Every house owner is forbidden to lease the same lodging to more than one family, unless the **cubic space** of all the rooms of such lodging, taken collectively, be sufficient to allow each eventual occupant at least three hundred cubic feet of space and the floor space be thirty-two square feet for each occupant. In calculating the three hundred feet above prescribed, account shall not be taken of the cubic space of rooms having no windows. (By-Laws).

43c. Every tenant is forbidden to sublet a portion of his lodging, unless the **cubic space** of all the rooms be sufficient to allow each eventual occupant of the lodging at least three hundred cubic feet of space and the floor space be thirty-two square feet for each occupant. In calculating the three hundred feet above prescribed, account shall not be taken of the cubic space of rooms having no windows. (By-Laws).

43d. It is forbidden to erect a dwelling or to proceed to the remodelling of a dwelling in which one or more rooms intended to be occupied during the day or during the night, would not be provided each with a **window opening directly into the external air,** either into a street or public square or into a yard or vacant space, the area of which will have been previously found sufficient by the municipal sanitary authority; but in no case shall the municipal sanitary authority authorize the building of a room on a yard or other vacant space, when the only window possible for such room will be facing a wall, whose height would exceed twice the distance between such wall and the base of the projected window.

The **glass area of the window** or of the whole of the windows shall never be less than one tenth of the area of the floor of the room.

A room without a window shall not be considered as forming part of an adjoining room provided with a window, unless 80 per cent of the **mitoyen** side remains entirely free and that there are no doors between such two rooms.

The **courts and yards** enclosed on all sides by buildings are forbidden, for all new or remodelled houses which will have more than one story, when such courts or yards are to be utilized for the admission of air or light into the house. The municipal sanitary authority may, however, tolerate, under certain circumstances of which it shall be the judge, courts or yards, for which have been provided, on the level of the ground, a draft of air from the street by means of one or more conduits whose total average diameter shall be at least seven feet. Such conduits shall never be obstructed, their openings may be protected by gratings. (By-Laws).

43e. In **night refuges** only such number of persons shall be admitted as will allow of each occupant of a ward or room having at least three hundred **cubic feet** of space, and in each room shall be posted up a notice specifying the maximum number of persons it can contain. Rooms without windows shall not be used for night occupation. The owner or person in charge of the refuge shall be held responsible for the observance of this by-law. (By-Laws).

43g. No building which has not **windows** on at least two sides can be used for future night-refuges. (By-Laws).

43h. **Cellars** shall not be used for either day or night occupation. For the purposes of the present by-laws, unless the municipal sanitary authority has decided otherwise, a cellar is any basement of any house or building whatsoever one-half or more than one-half the height of which under the ceiling is beneath the surface of the ground around the building or whose light area is not equal to one tenth the surface of the floor. (By-Laws).

43i. In the case of every new building to be used wholly or partly as a private dwelling or as a lodging-house, a **free space** of at least twenty-four feet shall be provided between all the points of the **front of such building** and the opposite property or properties. Nevertheless, a stair-case or portico or a fence not over seven feet high may be erected on the free space above prescribed.

The provisions of this article become applicable to every existing building to which extensions are contemplated. (By-Laws).

43j. In the case of every new building to be used wholly or partly as a private dwelling or as a lodging-house, a **free space** of a superficial area of not less than one hundred and fifty feet and belonging exclusively to the building shall be left **in rear of such building.** Such free space shall extend over the whole width of the building. The erection of a water-closet or other latrine shall, however, be permitted on such free space. Moreover, no portion of the rear wall of the building shall be built at less than ten feet from the boundary of the lot on which the building is erected; if the building is to have two stories, the distance from such boundary shall be fifteen feet; if it

is to have three stories, the distance shall be twenty feet; if it is to have more than three stories, the distance shall be twenty-five feet.

However, if the lot has little depth and therefore if impracticable to provide in the rear of the house the open space above prescribed, the house can be extended to the rear boundary of the lot, provided an open space of at least eight feet wide be left extending the whole length of each of the lateral walls of the house. If the house is to have two stories, the width of the open spaces will be twelve feet; if the house is to have three stories, the width of the open spaces will be sixteen feet; if the house is to have more than three stories, the width of the open spaces will be twenty feet.

The above requirements will not apply to a property which forms a corner of two streets when, in the opinion of the municipal sanitary authority, sufficient airing and lighting of the house will be provided without applying said above requirements.

The provisions of this article become applicable to every existing building to which extensions are contemplated. (By-Laws).

43k. Every person who shall build a house in future shall, if the soil be damp, insert in the foundation walls and throughout the entire width of such walls an impermeable **damp course** without a break.

Such damp-course shall be put in the wall under the level of the first floor of the building—the floor of the basement if there be one—and be carried up, if necessary, inside the wall so as to reach at least six inches above the soil around the buliding. **(a).**

The damp-courses shall consist of asphalt not less than one half-inch thick or of sheets of lead or plates of slate or glass laid in cement.

The municipal sanitary authorities may authorize other methods for damp-courses than those above prescribed after ascertaining that they are equal or superior in efficiency.

The soil on which a building is to be erected shall be considered damp:—

(1) Whenever the foundations of the proposed building will reach the first sheet of underground water or reach a layer of earth rendered damp by the fact of its lying immediately over the sheet of underground water;

(2) Whenever the municipal sanitary authority decides that other circumstances or conditions render the soil damp, or are likely to render it so to a sufficient extent to require the damp-course. (By-Laws).

3907. When a house is ascertained to be unhealthy, the municipal **sanitary authority may cause the inmates to leave it** and forbid their return until it has been rendered healthy in the manner which it prescribes. (Health Act).

Acting under the authority of article 3895 of the **Health Act,** the Board of Health of the Province has defined nuisances which are to suppressed by the municipal sanitary authorities. Among nuisances so defined are:

(2) Any property, building, house or dependencies rendered injurious to the health of the inmates, either by **faulty construction,** or by their being

filthy or **over-crowded**; also the day or night occupation of rooms having **no window** opening into the external air;

(3) Any school, workshop, factory, work-place and dependencies not kept in a cleanly state, or **not ventilated** in such a manner as to render harmless, as far as practicable, any gas, vapour, dust or other impurities or so **over-crowded** with people as to be dangerous to the health of those living therein.

Special enactments re Educational Institutions

69a. The **ground** on which an educational institution is built shall be **drained** to the satisfaction of the municipal sanitary authority. (By-Laws).

69b. The number of pupils to be admitted into a class or study-room shall be so limited that each of them and the teacher or master shall have a **minimum of one hundred and fifty cubic feet of air** and that the total area of the **floor space** shall be fifteen square feet at least per head. (By-Laws).

69e. In every new building, the class or study-rooms and dormitories shall not have a northern exposure, unless there be, in such rooms or dormitories, windows on another side by which **sunlight** is admitted. (By-Laws).

69f. The **temperature** in class or study-rooms shall not be under 65° Fahrenheit, nor above 70° Fahrenheit. (By-Laws).

69g. The **light area of windows** of class or study-rooms shall be equal to at least one-fourth the area of the floor; however, in the case of existing buildings a proportion of one-sixth shall be allowed. (By-Laws).

69j. The **windows** of the class or study-rooms **shall be opened** for at least half an hour after the pupils have left. (By-Laws).

69k. While pupils occupy class or study rooms, a minimum of **twenty-five cubic feet of fresh air per minute and per head,** taken from outside the building, shall be introduced into the said rooms.

From the 15th. November to the 15th. April, the fresh air shall be heated to a temperature of not less than 65° Farenheit and not more than 86° Fahrenheit, previous to its being introduced into the rooms. (By-Laws).

69l. To effect the ventilation prescribed by the above article, one of the three following **methods of artificial ventilation shall be employed from the 15th. November to the 15th. April:** (1) Ventilation by propulsion of fresh air (plenum system); (2) Ventilation by suction of the vitiated air by means of heat (thermal vacuum system); (3) Ventilation by mechanical suction of the vitiated air (mechanical vacuum system). From the 15th. April to the 15th. November, natural ventilation may be employed. (By-Laws).

69m. The section of the fresh air **inlets** and that of the vitiated air **outlets** shall measure one foot at least per twelve pupils. (By-Laws).

69o. The number of occupants of a **dormitory** shall be so limited that each of them shall have **six hundred cubic feet of air space** at least. (By-Laws).

69p. In **Infirmaries,** at least **twelve hundred cubic feet of air space** shall be provided per bed. (By-Laws).

69q. The prescriptions of articles 69k, 69l and 69m, relating to the **ventilation** of class or study-rooms apply equally to **dormitories and infirmaries.** (By-Laws).

69r. The use of **wall-paper** is prohibited in new buildings. (By-Laws).

69s. **Dry sweeping** is prohibited in educational institutions. (By-Laws).

Special Enactments re Hospitals or Houses for the Sick.

43p. The number of patients shall be limited in such manner that each of them shall have at least twelve hundred **cubic feet of air, except** in children's wards where a minimum of one thousand cubic feet of air shall be required.

43q. The **light area of windows** in each sick-room or ward shall be equal to at least one-sixth of the floor space. (By-Laws).

43r. In every house for the sick or hospital into which more than six patients are admitted at a time, a system of **artificial ventilation** shall be provided capable of assuring a renewal of air at the rate of at least two thousand five hundred feet per head and per hour for adult wards, and two thousand feet at least for children's wards. This article shall apply to existing establishments only when notified to that effect by the municipal sanitary authority. (By-Laws).

Re Contagious Hospitals

43v. The number of occupants of sick wards shall be limited in such manner that each patient shall have at least two thousand **cubic feet of space** and the floor space shall be at least one hundred and forty-four square feet per head. (By-Laws).

43w. The **light area of the windows** in each sick-ward or sick-room shall be equal to at least one-sixth of the floor space. The doors and windows of small-pox hospitals shall, between the 1st. May and 1st. November, be provided with metal fly-screens which shall be kept closed. (By-Laws).

43x. A system of **artificial ventilation** shall be provided capable of assuring a renewal of air at the rate of at least two thousand five hundred cubic feet per hour and per head. The fresh air shall be heated to at least 60° Fahrenheit previous to being introduced. This article shall apply to hospitals already established, only when notified to that effect by the municipal sanitary authority. (By-Laws).

Re Lying-in Hospitals.

43ee. The number of persons admitted into such houses or lying-in hospitals shall be so limited that each person shall have **at least one thousand cubic feet of space.** (By-Laws).

43ff. The **light area of the windows** of each sick-room or ward shall be equal to at least one-sixth of the floor space. (By-Laws).

43gg. In every lying-in-hospital where more than six persons are admitted at a time, a system of **artificial ventilation** will be provided capable of securing

the renewal of air at the rate of two thousand cubic feet at least per head and per hour. This article shall apply to lying-in-hospitals already established only when notified to that effect by the municipal sanitary authority. (By-Laws).

Re Hospices, Sanatoriums and Sheltering Homes

43jj. The number of persons in the institution shall be limited in such manner that in the rooms where they remain for more than an hour at a time the **cubic space** shall be at least four hundred cubic feet in the case of children and eight hundred feet in the case of adults. (By-Laws).

43kk. The **light area of the windows** in each room shall be at least one-sixth of the floor surface. (By-Laws).

43ll. In every institution wherein more than fifteen persons are admitted at a time, a system of **artificial ventilation** shall be provided capable of securing, at least in all the rooms occupied for more than an hour, a renewal of air not less than eighteen hundred cubic feet per head and per hour. This article shall apply to existing institutions only when notified to that effect by the municipal sanitary authority (By-Laws).

Special Enactments re Industrial Establishments

5. From the first of October to the first of May, each workman must have **at least 400 cubic feet of air.** (By-Laws).

6. During the interruption of work for meals, the workroom must be vacated and the air therein completely renewed by the **opening of the windows.** The air is also to be entirely renewed after the work is over at night, or in the morning before the opening of the workshop. (By-Laws).

7. When he believes it necessary, the sanitary physician may, of his own accord, prescribe any **artificial ventilation,** by propulsion or by extraction, capable of furnishing at least one thousand cubic feet of fresh air per hour for each workman. The air thus introduced must not be of a temperature of less than 60° Fahrenheit. (By-Laws).

13. All **dust, gases** and offensive, unhealthy, and toxic **vapors** must be conducted directly out of the workshop as soon as they are produced and this to the satisfaction of the sanitary physician. (By-Laws).

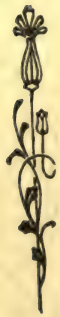
14. In order to provide against **reeks, vapors, gases, light dusts,** funnels must be constructed connected with draught-flues or any other apparatus for an efficacious elimination. (By-Laws).

15. **Millstones, threshers, crushers** and other mechanical apparatus must be enclosed in drums put in direct communication with a strong aspirator in order that dust be removed. (By-Laws).

16. For **heavy gases** such as vapors of mercury and of sulphide of carbon, the ventilation must be made per descensum, and the working tables and other working apparatus must be in direct communication with the ventilators. (By-Laws).

17. The pulverization of **irritating or toxic matters** or other operations, such as **sifting and packing,** must be done mechanically in closed apparatus. (By-Laws).

18. When there is but a part of industrial operations that causes **dusts, gases** or **vapors,** the sanitary physician may require that such operations, which he is to designate, are to be carried on in rooms entirely separate from the rest of establishment. (By-Laws).



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